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THE WESTCHESTER ELECTRIC LINE

The New York, Westchester & Boston Railway, in its methods both of construction and operation, is essentially a high-speed interurban line operating on private right-of-way, with splendid provision for the highest standards, in a territory that is mainly suburban in nature. The initial operation of the road this week affords no real test of the traffic possibilities of the new line. The use of the temporary station at 180th Street as the present New York City terminal is the reason why the traffic possibilities, even with the present undeveloped state of the territory served, cannot be measured fairly. This terminal is reached by a long walk from the station of the Interborough Rapid Transit Company subway, on which passengers ride to and from the center of Manhattan. When a connection is built between the Westchester line and the affiliated Harlem River & Port Chester road the terminal will be extended to Harlem River, where there will be a convenient means of transfer to the elevated lines of the Interborough company. A real test of the traffic outlook for the new improvement will be possible then. In the meanwhile the road must be regarded as still in an uncompleted state. While the property is in that situation the company may be open to the unfavorable and light criticism that the road is built through a district of sparse settlement. We prefer to recognize the courage, foresight and belief of the builders in the future of New York and its suburbs, which were so great as to enable them to go ahead with a railway enterprise that is without a parallel in this country.

ADVANCED STANDARDS

In the construction of many of the high-speed interurban lines in the Central West the scarcity of available capital led the promoters to follow inexpensive standards in construction at the beginning and then, as earnings increased and possibilities became brighter, to improve the property. With the New York, Westchester & Boston line, however, that part of the road which is in operation sets so high a standard that, even if the advantages of the electrical equipment are disregarded, the railroad is on a plane which the strong steam railroads of the country have achieved only after long years of improvement and profitable operation. With the electrical equipment considered in addition to the other features of construction, the new line becomes one that is comparable from a physical standpoint with the nearby New Haven and New York Central electrified zones, except that in the motive of construction and the natural sources of its traffic growth it is similar to no other property with which we are acquainted. The interurban lines of the Central West, where a larger amount of development for high-speed electrical operation has taken place than in any other section, connect generally some centers of business with outlying communities in which manufacturing and farming activities are prominent. The Westchester line, starting in a crowded section of the borough of the Bronx, New York City, about 14 miles from the City Hall, passes through a district of gradually decreasing density of settlement and

reaches quickly a section of the city which is very sparsely inhabited now because of lack of transportation facilities but is well suited naturally for building purposes. The right-of-way then extends through a similar district in Westchester County and serves certain sections of suburban communities which have not been accessible easily from the stations of the trunk lines extending through those districts. For this new application of electricity to the problem of transportation success is the merited end for which the industry wishes.

OIL FURNACES FOR BLACKSMITH WORK

To anyone not well acquainted with electric railway shop practice the general absence of oil furnaces in the blacksmith shops seems somewhat extraordinary. Within the last decade the oil furnace has absolutely displaced the old-fashioned coal-burning blacksmith forge for a number of classes of smith work. The change, however, does not appear to have extended to the electric railway field. Oil-burning furnaces with their reverberatory brick linings, their "clean" heat and their close adjustment of temperature offer so many advantages over the coal-burning forge that it is difficult to see any reason why they should not be adopted, to some extent at least. It is perhaps not realized generally that an oil furnace can be started in the morning and run all day at a practically constant temperature and absolutely without attention. In it can be placed any number of pieces of iron. They can be left there almost indefinitely with no more injury than a slow "wasting." The blacksmith does not have to watch his heat as he does with a forge in order to prevent burning, and owing to the fact that he is not limited to heating only one piece at a time there need be no waits between heats. The oil furnace is, of course, considerably more expensive to install and maintain than the forge, but the saving in time which can be effected by it is enormous. There are, it is true, many cases where the furnace cannot be used. Short heats on heavy pieces can practically be made only in a forge. In fact for general flexibility the latter has a decided advantage. However, in electric railway shops where the blacksmith work amounts to more than "odd jobs" the furnace appears to offer an opportunity for a distinct saving.

THE RISE OF THE MOTOR BUS

It is a little startling to hear a declaration that street railways have reached the zenith of their development and will gradually be replaced by other and more efficient means of local transportation. Nevertheless this is the declaration soberly put forward last week by the vice-president of the Automobile Club of Great Britain, who is visiting this country on a tour of investigation. The substitute for the street car, in his mind, is the motor bus which is now being used so extensively in London and Paris, and its chief advantage over the street car is claimed to be its ability to carry more people in a given time because it is not confined to a fixed route in the streets and thus is less subject to delay from street congestion than the street car. Moreover, passengers in motor buses can be set down at the pavement curb and thereby avoid the risk and inconvenience to which passengers on cars are subjected, who have to pass from the car platform. If our British visitor was to receive power to solve the New York transportation problem, he says that he would sweep the street railways from the more crowded portions of the city and introduce bus lines in their place. We have already discussed in this paper the reasons for the great development of the motor bus in London and the way in which it is favored in the way of franchise requirements in that city over the tramcar. The conditions in Paris until recently have been largely the same, but under a new franchise granted last year by the municipality a rapid development of the Paris street railway system is under way and will probably change the relative importance of street car and bus transportation in that city. We grant that the freedom of movement of the bus allows it to avoid blockades to some extent. But the presence of the buses themselves on the streets contributes greatly to street congestion, whereas we believe it has been shown that a line of cars on a fixed track not only contributes little to street congestion but usually tends to reduce it by helping to keep the street movement in an orderly procession. Our street railway critic does not discuss costs, but we can hardly believe that any independent vehicle propelled over a street pavement can be as efficient as an electric car in tractive effort, or in cost of power, or in maintenance.

ADVANCED ELECTRIC RAILWAY WORK IN HUNGARY

The high-tension direct-current electrification of the extensive Budapest suburban railway system, as described elsewhere in this issue, offers much of value to American engineers in several branches of electric railway work despite the fact that the operating conditions on the Budapest lines differ materially from those in this country. Of course, the adoption of 1000 volts d.c. for a system which penetrates thickly populated suburban territory is the feature of commanding interest in this Hungarian installation. By using high-tension direct current instead of alternating current, the suburban cars can eventually be operated over the city tracks without requiring any complex a.c.-d.c. equipments. In fact, the Budapest system resembles the 1200-volt d.c. installations in many parts of this country in the condition that the car apparatus is operated at half-voltage over certain sections.

A glance at the map in the article would indicate that the logical center of electrical distribution should be Budapest itself. Unfortunately, as high-tension a.c. conduits were too costly and aerial lines were considered too dangerous for the greater part of the suburban districts, each of the three lines had to be furnished with a separate power station. The two shorter lines which follow the densely populated banks of the Danube have straight 1000-volt d.c. generation and transmission, whereas the longest line, which runs through more open country, has the orthodox a.c.-d.c. combination except that the use of 10,500-volt turbines eliminates the need for step-up transformers.

The power stations already in service embody quite a number of progressive features. Thus, the construction cost of the buildings must have been materially reduced by introducing a traveling hopper between the outside coal storage and the boilers to dispense with the usual overhead

bunkers. Furthermore, the first cost and operating expenses of the telpher system should be less than even the cheaper forms of conveyors. A second feature of interest is the use of electrically driven auxiliaries throughout, a fact which speaks well for their reliability and efficiency inasmuch as these plants are independently operated. In accordance with common practice, the a.c. station is equipped with turbines. The first d.c. plant, however, has two cross-compound condensing engines, each of which performs the unusual duty of driving two generators of different voltage. One machine generates 600 volts and the other 450 volts, so that both the 600-volt and the 1000-volt section have the benefit of direct feed. The rapid advance of the direct-current turbine in larger sizes is shown by the fact that the second d.c. station will contain two 1000-kw, 1100-volt units. The switching equipment of the substations as well as of the power stations is noteworthy for the extensive use of distant control. In one case where a switchboard was erected for a booster set a screen was installed to prevent persons from coming into contact with the live parts on the back of the board.

The railway line construction adopted for the Budapest system is of the simple catenary type but is novel in the use of a V-shaped hanger which has a clamp to permit the sliding of the trolley wire within a limited distance. These hangers are installed at the short average distance of 13 ft., although they appear to offer a more stable suspension than the customary vertical types.

The rolling stock follows the radial axle design which has been found so suitable for the lighter cars and slower speeds common on European suburban railways. The present universal tendency to eliminate the monitor roof is shown in the installation of louvers above the side windows instead of following the American practice of using hood or mushroom ventilators in the single-arch roof. The adoption of independently driven compressors on the cars with automatic control is obviously an admission that they are superior to the axle-driven compressors long popular in Europe, which naturally lose their effectiveness in proportion to the number of stops. It is noteworthy that in the design of the electrical equipment of the cars much care was taken to promote effective maintenance as well as operation. One instance is the use of a circular shield for the motor bearings which permits the armatures to be rolled on the ground without coming into contact with metal dust and filings. Another is the installation of the cut-out switch outside the controller so that defective motors can be cut out at once without the annoyance of opening the controller case. The location of the circuit-breaker underneath the car instead of the hood avoids startling the passengers, while it obliges the motorman to exercise more care in controller operation. The incorporation in the master controllers of a control feed mechanism with quick release is also of interest.

The article as a whole presents very clearly the great differences between American and European suburban and interurban railway practice. Of all the comparisons which could be made, perhaps the most striking is that in the motor equipment, which shows that even the Budapest locomotives which haul long trains carry only two 150-hp motors, while the motor capacity of a standard car equipment is but one-half of that of many interurban cars in this country.

PROPOSED FREIGHT TRANSPORTATION IN CHICAGO

Since the Chicago City Council granted the Chicago & Interurban Traction Company the right to carry package freight into the heart of the business district between the hours of 11 o'clock p. m. and 5 a. m., there has been considerable agitation in favor of an extension of the same privilege to all the surface and elevated railway companies. This would not only increase the gross revenue of the railway companies materially but would add to the city's proportion of the net profits, and with both of these benefits in view it is probable that the package freight-carrying privilege will be embodied in the unification ordinance. The addition of this class of traffic has many advantages both to the city and the railway companies. Not only would it increase the earnings but it would reduce the cost of producing energy in that it would serve to increase the output during the off-peak hours, it would keep idle equipment in service and it would increase the operating expense but little. From the city's viewpoint the addition of a package freight business to the passenger business handled by the railway companies would serve as a cheap, quick method of distributing supplies from the wholesale district to the suburban retail district and would reduce the street congestion by removing many of the trucks now in use. All classes of building material could be delivered or removed from the "Loop" district at night. The cost of maintaining the street pavements would be correspondingly less because the wear would come on the rails, which are maintained by the railway, and not on the pavements, which are paid for by the city. There is slight doubt that service of this character could be furnished at a rate considerably under the cost of the present methods of handling the package business, with the advantage of the quick service which could be rendered at night when the streets are comparatively free from vehicular traffic.

Little preparation so far as the surface companies are concerned would be necessary. Shipments could be handled by methods similar to those now used in handling United States mail to and from the outlying districts; that is, the freight could be transferred direct from the car to trucks which would then only have a short haul. The elevated railway could not be equipped for a freight business without considerable expense, yet the advantage of rapid transit on these lines might be had by incoming interurban railways. Their freight could be brought to central delivery stations, whence it could be handled by trucks or the surface railways to points nearer the destination. Municipalities which oppose freight rights of this kind do so usually because of the bogy that long trains of freight cars will be hauled through the streets. No such plan is contemplated. Such extensive operation should and would be confined to regular freight yards. The service proposed is a substitute for that now being conducted by freight drays and express wagons and would result not only in economy in distribution expenses but in less, rather than in more, noise and congestion in the streets. We believe the proposed ordinance should receive favorable consideration in Chicago.

BOSTON AND BROOKLYN OPERATIONS

Operations of the Boston Elevated Railway Company and the Brooklyn Rapid Transit System invite comparison because of the apparent similarity of the two properties. Each operates primarily in a district of great congestion, but has outlying communities which afford comparatively light traffic. Both have combined surface and elevated mileage, and other general characteristics of the properties are somewhat alike.

Many of the points of similarity disappear upon the closer analysis that is possible when we go beyond the dry figures of returns in the annual reports and rely upon knowledge of the actual differences in methods of construction, operation and traffic peculiarities inherent in each city. To a large extent Boston originates and receives the same traffic, while Brooklyn is tributary to Manhattan and its traffic is restricted by the capacity of the funnel-like Brooklyn bridge connection with Manhattan. Unless full allowance is made for all of the differences that exist in the physical characteristics and traffic conditions of the two systems, it is impossible to make any comparison of properties that would be perfectly just to each. But if such allowances are made with nicety no two properties in the country will be found operating under like conditions and there will be no room for any comparison. We have chosen therefore to make such comparison as is possible of the operations of these two properties for the year ended June 30, 1911, coupling it with the statement that the results are intended to be rough approximations of certain differences that are shown and do not justify deductions as to the relative efficiency of either system.

The first point of comparison is in track mileage. The Boston company operated, according to the annual report for the year, 488 miles of all kinds of track, while the Brooklyn company showed a total of 613 miles. Of the Boston total of track mileage, 94.7 per cent is surface track mileage, while 5.3 per cent is elevated. On the Brooklyn system, 88.4 per cent of the total is surface trackage, while 11.6 per cent is elevated. Thus relatively twice as much of the Brooklyn trackage is elevated as of the Boston trackage. This, however, does not tell the full story. The Boston elevated trackage aggregates 25.6 miles; the Brooklyn elevated trackage, including a very small proportion of steam railway surface trackage, aggregates 71.3 miles, or nearly three times as much in actual length. Here a wide dissimilarity in the uses to which the property is put should be noted. The elevated mileage in Boston is designed largely to supplement the surface system by affording convenient terminal and loop facilities in the downtown and nearby districts. Much of its traffic is non-paying transfer business exchanged with the surface cars. While the Brooklyn elevated lines have a relatively small number of non-paying transfer passengers received from surface cars, they actually contribute two-thirds as much in gross earnings as the surface division. This may be indicated in a striking manner by comparison of the differences in earnings for the two divisions. The Brooklyn surface division furnished $12,976,397 of the passenger earnings, while the elevated division contributed $8,377,966. Per mile of track these figures average: Surface, $23,946; elevated, $117,503.

With, therefore, one-quarter more mileage than the Boston company the Brooklyn system shows greater gross earnings from operation by 40 per cent. The gross revenues are as follows: Boston, $15,635,965; Brooklyn, $21,986,543. No exact comparison of passengers carried can be made, for the reason that the Boston report gives the total of revenue passengers only, while the Brooklyn figures show the combined transfer and revenue traffic. The Boston report necessarily omits the transfer traffic because of the large number of bodily transfers at surface, elevated and subway stations in that city for which no transfer slips are received. The Boston company carried an average of 625,202 revenue passengers per mile of total track. The Brooklyn report shows an average of 932,922 revenue and transfer passengers per mile of track. If the gross passenger earnings of the Brooklyn system are assumed to be entirely the result of 5-cent fares, they would indicate an average of 696,717 passengers per mile of track. They included, however, some 3-cent local bridge fares as well as suburban 10-cent rides.

The greater density of traffic in the Brooklyn territory is reflected in the gross earnings per mile of track, which averaged $35,867. In Boston the average was $32,041. Although the operating ratios show a wide variance, being 64.7 per cent in Boston and 55.3 per cent in Brooklyn, the average operating expenses per mile of track are closer together than the revenues. The expenses in Boston were $20,736 per track mile, while in Brooklyn they were $19,847. The smaller expenses per track mile of the Brooklyn company, plus its larger revenue, left it with a greater amount of net revenue from operation per track mile. Brooklyn showed an average of $16,020 as compared with $11,305 in Boston.

If the expenses are analyzed further, they show wider differences in some of the general operating expense accounts. For instance, the Boston company spent more on maintenance of way and structures per mile of track than Brooklyn. The figures were as follows: Boston, $3,189; Brooklyn, $2,321. The maintenance of equipment expenditures, taking the average per mile of track, were greater in Brooklyn, amounting to $3,467 as compared with $2,602 in Boston. It is a coincidence that the total maintenance expenditures per mile of total track were almost exactly the same in the two cities. They were $5,791 per mile of track in Boston and $5,788 in Brooklyn. In percentage of gross the Boston company spent 18.1 per cent on maintenance and the Brooklyn system 16.1 per cent.

Transportation costs per track mile in Boston were $11,357. The Brooklyn classification is somewhat different, not only in its details of expense as shown in the report, but also in the text of the classification followed. While it is not practicable to analyze here the various points of difference in the classifications which affect the comparison to some extent, the details of the transportation expenses as shown in the Brooklyn report may be averaged per mile of track and stated as follows: Operation of power plant, $2,185; operation of cars, $8,644; total $10,829.

The remaining basis of comparison possible with the figures in the reports is that of car-mile results. The Boston revenue from operation per car mile was 28.6 cents. Brooklyn showed 27.6 cents. The relative operating ex-

penses per car mile were as follows: Boston, 18.5 cents; Brooklyn, 15.3 cents. Thus the net earnings from operation were equal to 10.1 cents per car mile in Boston as compared with 12.3 cents in Brooklyn. Because of its publication of the statistics of revenue passengers the Boston company's average of revenue passengers carried per car mile is ascertainable. This was 5.6. Mail-car revenue in Boston averaged 16.3 cents per revenue mail-car mile. General expenses per car mile showed a material difference. They were 3 cents in Boston and 2.2 cents in Brooklyn. In maintenance of equipment the expenditures per car mile were a little greater in Brooklyn. The Brooklyn company showed an average of 2.7 cents for this purpose as compared with 2.4 cents in Boston. The average car-mile expenditure for maintenance of way and structures was greater in Boston, where it averaged 2.8 cents, than in Brooklyn, where the corresponding figure was 1.8 cents. The total maintenance expenditures were therefore 5.2 cents in Boston and 4.5 cents in Brooklyn. Transportation costs equaled 10.1 cents per car mile in Boston and traffic expenses were 0.2 cent. The remaining operating expenses per car mile in Brooklyn were as follows: Operation of power plant, 1.7 cents; operation of cars, 6.6 cents; freight, mail and express, 0.3 cent.

When the day of perfect uniformity in accounting is reached fairer comparisons can be made than are possible now. The figures given, however, if taken separately for each company, show some of the general results of operations under the conditions prevailing.

TERMS OF INTERBOROUGH SUBWAY FINANCING IN NEW YORK

The bottom price that is to be paid by the underwriters of the $170,000,000 Interborough Rapid Transit Company bonds which are to provide funds for the new subway undertaking of that company in New York is 96. This, however, may be bettered substantially because an uncommon provision in the contract with the bankers provides that after the deduction of all expenses the syndicate shall divide equally with the company any amount received from the sales of the bonds in excess of an average price of par and accrued interest. Some additional profit should be received by the company from this arrangement, as the bonds bear 5 per cent interest and have a life of fifty-three years, and therefore offer favorable investment terms. The effect of the selling arrangement is that the company participates with the syndicate in the event of a net syndicate profit of above 4 per cent on the par value of the bonds, but does not suffer if investment or financial conditions should cause the public to absorb the bonds slowly or should hold the price down so as to make the syndicate profit unsatisfactory or uncertain.

The contract made with J. P. Morgan & Company, who are organizing a syndicate for the purpose of underwriting the issue, disposes of all of the total of $170,000,000 bonds under a definite arrangement by which the company will be supplied with the money as it is believed it will be needed. Nearly half of the bonds are to be taken up in the first year and the remainder in nearly equal annual instalments. The approximate percentage of the total amount of bonds to be taken up by the bankers in each of the four fiscal years is as follows: In 1912-13, 46 per cent; in 1913-14, 18 per cent; in 1914-15, 18 per cent; in 1915-16, 18 per cent. The strength of security of the bonds, apart from the present great earning power of the existing Interborough system and of the prospective benefits from the opening of rapid transit facilities for both outlying and congested districts, lies in the arrangement for a sinking fund which is designed to retire the entire issue during the term of the lease and in the preferential payment to which the city agrees. The sinking fund will be 1 per cent per annum and is to begin in five years from the date of initial operation of the new subways, or in any event not more than ten years from the date of the bonds. As bonds may be drawn for the sinking fund at 110 or bought in the market at lower prices, there is a possible additional profit for all who buy at figures less than that at which redemption for the sinking fund may take place. The right to increase the amount of the sinking fund at any time is reserved by the company so that the bonds may be retired with reasonable rapidity if that should prove desirable.

As the total amount of $167,156,950 estimated as necessary for the company to raise is a little more than the amount that will be available from the sale of $170,000,000 bonds at 96, it is evident that some reduction in costs from the preliminary figures is anticipated or that still more of the proposed authorized issue of about $200,000,000 will be put out before the financing is fully completed. The proportions of the amount now estimated as necessary to be used for the purposes stated are as follows: For refunding present debt, $50,656,950, or 30 per cent; for construction of new subway—that is, the one-half of the cost to be met by the Interborough company—$56,000,000, or 34 per cent; for Manhattan (elevated) Railway improvements, about $30,000,000, or 17 per cent; for equipment of new subways, $21,000,000, or 13 per cent; for other charges, about $9,500,000, or 6 per cent.

President T. P. Shonts of the company estimates that the net earnings of the completed properties available for interest in the first five years, including the elevated lines, will average $13,038,000 annually. This is more than double the average annual amount of net earnings on the present subway during the last two years, which was $6,335,000. The latter sum, in addition to the 5 per cent interest and 1 per cent sinking fund requirement on the investment by the company of $77,000,000 of new subway capital, is to be a first charge on subway earnings under the new arrangement. A similar protective arrangement prevails with respect to the elevated earnings and proportionate interest requirements. The only question to be settled before the whole arrangement is made operative is that of the legality of the preferential payment of 8.76 per cent, which is now before the Court of Appeals. The Brooklyn Rapid Transit Company plans for financing its share of the improvement have been made but have not been announced in detail, although it is understood that a new company, independent of the existing lines, will be formed to direct the enterprise.

New York City has been almost at the point of additional subway progress before, and it is the general earnest wish that nothing may occur now to prevent the consummation of the plans which will meet the serious needs of the community.

The 1000-Volt D.C. Electrification of the Budapest Local Railways, Hungary

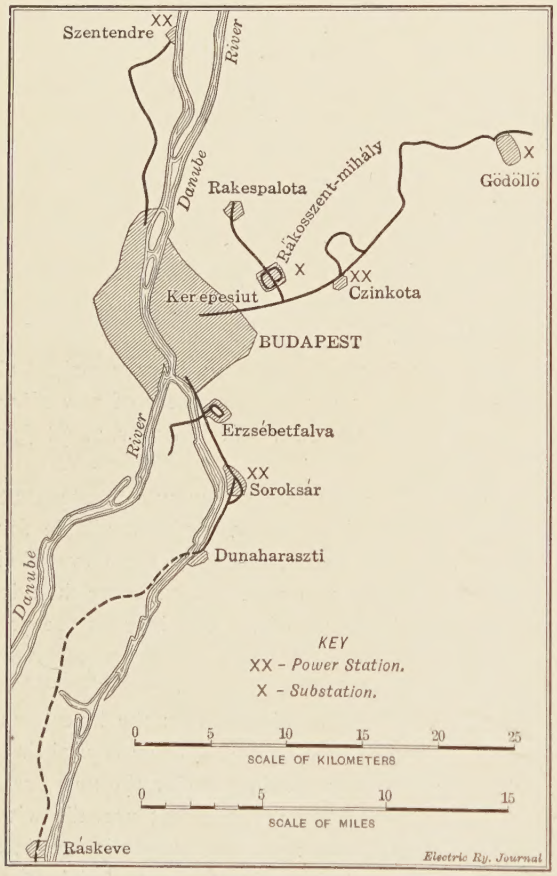
The Equipment of These Important Lines Embraces Many Striking Novelties for the Power Stations, Substations, Line Construction and Rolling Stock

BY JULIUS DE FISCHER, CHIEF ELECTRICAL ENGINEER OF THE COMPANY

The Budapest Local Railways (Budapesti Helyi Érdekü Vasutak) are a system of suburban and local lines radiating north, east and south from the city of Budapest, as can be seen from the accompanying map. These lines serve a populous country, connecting Budapest, having nearly 1,000,000 inhabitants, with the numerous towns and villages in the vicinity with from 5000 to 25,000 inhabitants each.

EXTENT OF SYSTEM AND VOLTAGE

The length of route of the system is 55.3 miles, of which 44.3 miles is double-track. The single-track length, including 17.4 miles of station sidings, amounts to 123 miles. The extent of the system as a whole, together with the dense and continuously increasing traffic, makes this one of the most important among the electrified local railway systems of the Continent.



Budapest Railways—Map of 1000-Volt D. C. Lines

The operating and track length of the three different lines of the system are as follows:

	Length of Route, Miles.	Length of Single Track, Miles.
Budapest - Gödölló	29.8	61.4
Budapest - Dunaharaszti	15.5	32.9
Budapest - Szentendre	10.0	28.5
Total miles	55.3	122.8

All these lines are of standard gage equipped with rails of 60 lb. per yard, which permits a weight per axle of about 31,000 lb. Outside of the metropolitan area the lines run on right-of-way. Within the city the connection with the tracks of the city street railways is already effected. At present, however, the interurban trains do not run over the city tracks, and cars are changed at the city terminals.

The electrification of the Gödölló and the Dunaharaszti lines has now been finished, while that of the Szentendre line is still under construction. Electric operation was inaugurated on the Dunaharaszti line on Aug. 4, 1910, and on the complete Gödölló lines on Dec. 1, 1911.

The 1000-volt direct-current system is used for all lines, except for the 3.1-mile double-track section between Budapest and Erzsébetfalva on the Dunaharaszti line and for a loop line in the town of Erzsébetfalva. These latter, having been in electric operation at 600 volts since 1906, have been left at that voltage in order to continue the operation of city cars. The interurban trains travel over the same section at a speed reduced in proportion to the voltage, which answers the conditions very well.

GENERAL SCHEME OF ELECTRIFICATION

Each of the three lines has its own generating station. Advantage could not be taken of the superior economy of one common power plant because of the great expense and difficulties connected with an underground distribution system, and also because aerial high-tension transmission lines were out of the question in the densely inhabited country around the city.

The power plant of the Gödölló line is at Czinkota, 6.2 miles from Budapest. It generates three-phase energy at 10,500 volts and 42 cycles. This is transmitted to two substations, namely, Rákosszentmihály, 3.7 miles, and Gödölló, 17.4 miles distant. The Gödölló substation has been placed at the extreme distance mentioned in view of the further extension of the line in the near future. The power is transformed in these substations to direct current at 1100 volts and fed to the trolley line.

The power plant of the Dunaharaszti line is situated near Soroksár, 3.7 miles from Budapest. It produces d.c. power on two circuits, so that the main line can be fed at 1100 volts and the Budapest-Erzsébetfalva section at 600 volts. The two circuits have a common grounded return through the rails.

The power plant of the Szentendre line will be situated at Szentendre, also because of further extensions. This plant will generate direct current.

POWER PLANT AT CZINKOTA

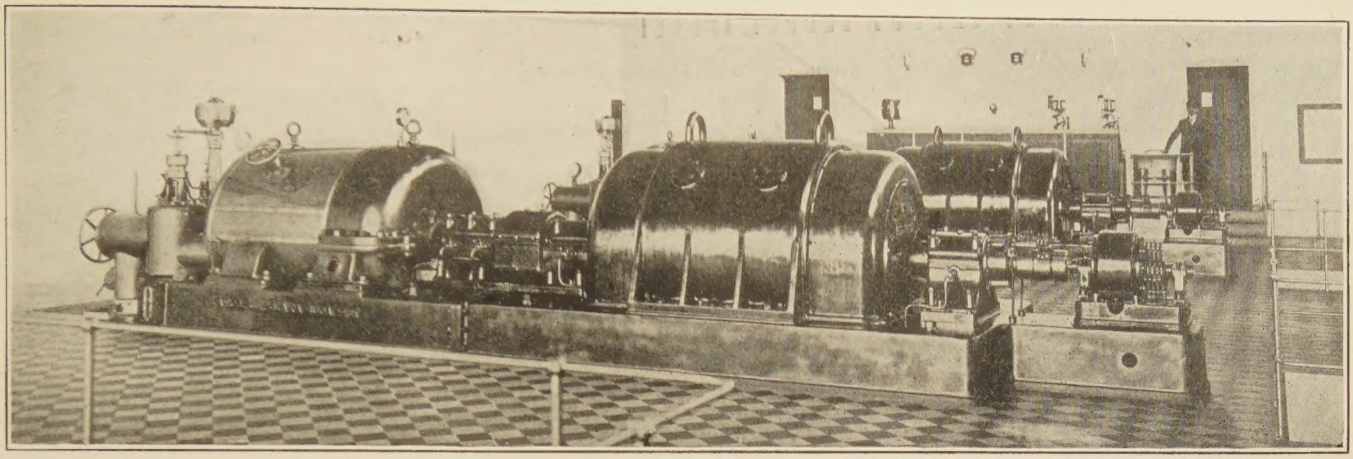
The engine room of the Czinkota plant contains two 2000-hp turbo-generator units, ample space being left for a third set, possibly of greater output. Each steam turbine, which is of the Zoelly action type, is directly coupled to a 10,500-volt, two-pole, three-phase generator running at 2520 r.p.m. The alternator is both air-cooled and water-cooled. The air-blast is produced by the ventilating action of the rotating part of the alternator, while the feed water of the boilers is used for the water cooling. A direct-coupled exciter furnishes the low-voltage exciting current.

The condenser equipment is in the basement. The air pump and the circulating pump of the surface condenser are electrically driven, for which purpose a 200-volt, three-phase induction motor and a 1000-volt commutating-pole d.c. motor are directly coupled to the centrifugal circulating pump, which combination carries also a pulley for the drive

of the air pump. The three-phase motor is used for the regular service, while the d.c. motor serves for starting. Thus the condensation is started from the trolley line with current from the storage battery in the Rákosszentmihály substation. This arrangement avoids the inconvenience of starting the turbine without the condensation and changing over to condensation while running.

Means are provided for the connection of each condensing set to any of the turbines. The vacuum under full load and under the most unfavorable summer conditions with regard to the efficiency of the cooling tower is at least 92 per cent, but during a recent overload test the vacuum reached 95 per cent, with 310 deg. Cent. superheat and 14.2 lb. steam consumption per kw-hour.

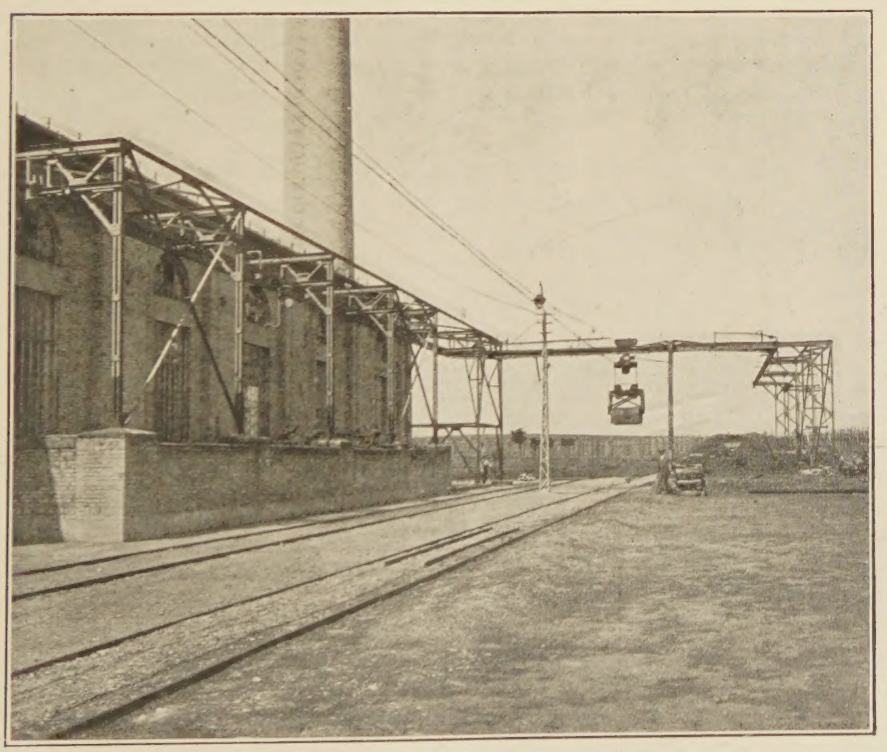
The switchboard equipment consists of a benchboard and of the high-tension compartments. The latter carry all high-tension apparatus, such as oil switches, disconnecting knives, current and voltage transformers, lightning arresters, etc., with their connections, busbars, and the transformers for the low-voltage auxiliary apparatus. All of these are arranged in different cells, partitioned by fireproof "Duro" material. The oil switches, with the exception of those of the alternator circuits, are arranged for automatic break with combined time-limit and maximum-limit action for overload, as well as with no-voltage action. All oil switches are actuated by remote control from the benchboard already mentioned. This benchboard carries the low-voltage switches with the corresponding signal lamps, the exciting rheostats of the alternators and all measuring instruments. The latter include also a synchronizing set, consisting of a phase-indicating voltmeter, phase lamps and a synchronizing indicator of the rotating lamp type.

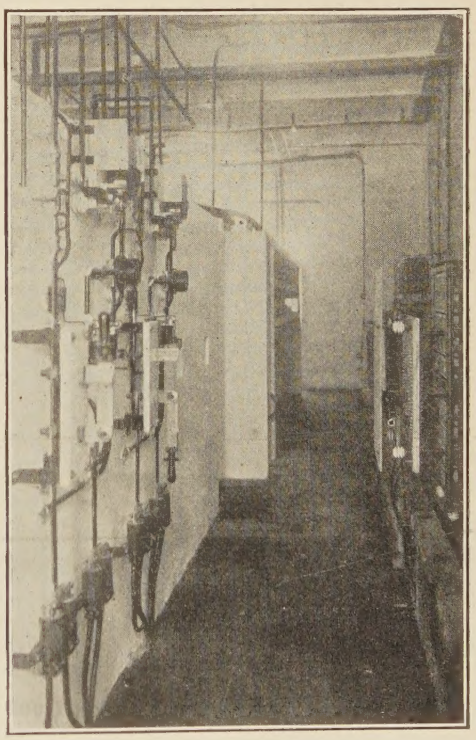


Budapest Railways—View of Turbine Installation at Czinkota

The high-tension compartments and the benchboard are situated at one end of the turbine room. The low height of the turbo-generators allows a free view of the whole room from behind the low benchboard, notwithstanding the small elevation of the switching platform.

A small motor-generator in an adjoining room produces 110 volts d.c., and in connection with it a Tudor storage battery is used. This current serves for the remote control of the switching gear and to actuate the coal-transporting apparatus described later. The lighting of the plant is usually done from the low-voltage three-phase circuits,

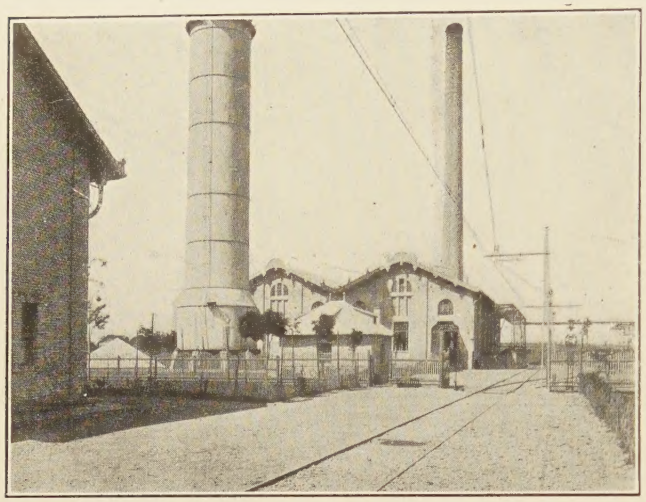




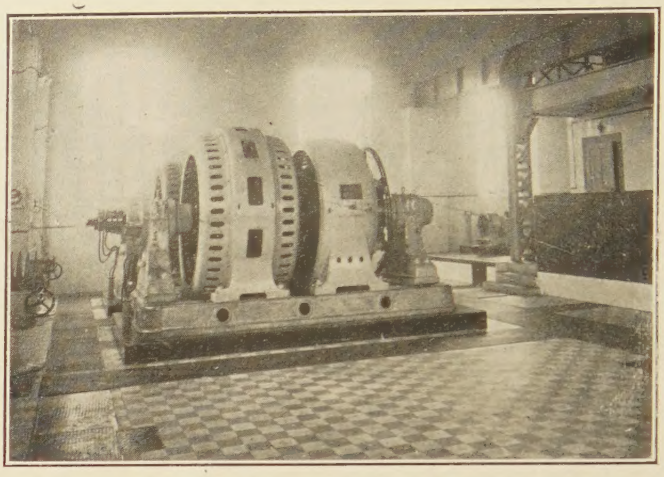
Budapest Railways—Outside Coal-Handling Equipment at Czinkota Power Station, and High-Tension Apparatus in the Basement of the Gödölló Substation

but in case of failure of the three-phase current the low-voltage direct current is used for lighting.

The boiler room contains four B. & W. boilers, each of 3640 sq. ft. heating surface and 1030 sq. ft. superheater surface, for a boiler pressure of thirteen atmospheres. The fire grates of 88 sq. ft. surface are of the traveling chain-grate type and are driven from a common transmission



Budapest Railways—Czinkota Station and Cooling Tower



Budapest Railways—Interior of the Gödölló Substation

shaft actuated by one of two 5-hp three-phase motors which are installed in the cellar below. The steam piping is in duplicate and arranged to permit the use of any boilers with each of the steam turbines.

The boiler room contains Derveaux feed-water cleaning apparatus for the supplementary feed water taken from an artesian well or from an open well, both in the power house yard. Beside the feed-water cleaner are two boiler-feed steam pumps and one untreated water pump, which is also arranged to serve as fire pump if required. All pumps are of the Worthington type.

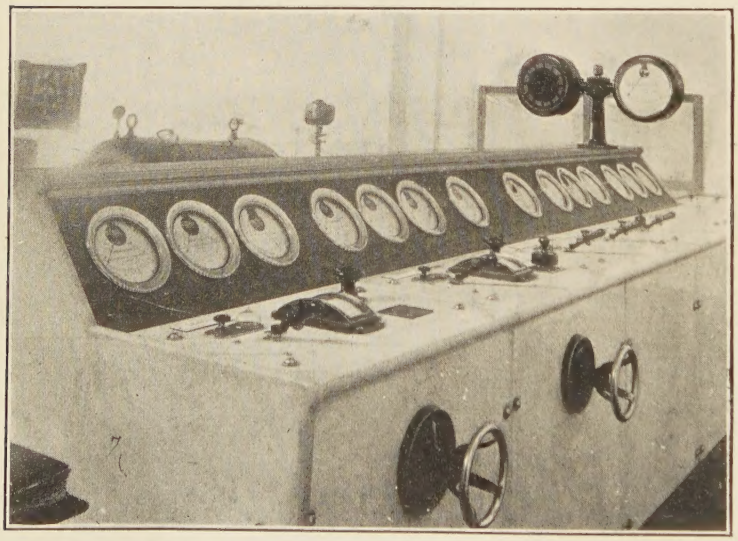
The power house yard contains a Worthington cooling tower which can handle about 180,000 gal. of circulating water. Besides this, a hot-water tank for another tower, already prepared for future extensions, is serving now as a storage tank for the circulating water only. An underground chamber near the base of the tower contains two electrically driven pumps to lift the water from the artesian or the open well into the cold-water storage tank beside the boiler house. This storage tank will hold sufficient water for forty-eight hours.

Special mention should be made of the coal and ash handling machinery. The coal is lifted from the railway cars by a motor-operated scoop traveling on overhead rails. The scoop is emptied into storage bunkers outside the boiler house. From these bunkers the coal falls through sliding doors into a traveling bucket, which, when filled, is lifted and carried over the hoppers of the chain grates and emptied there. The mode of suspension, movement and d.c. control of this bucket is very similar to that of the scoop outside. The same equipment serves also for the handling of the ashes, which are collected beneath the grates into bucket cars running on a narrow-gage track and emptied in a bin outside the boiler house, from which they will be lifted by the outside scoop for deposit into a railway car.

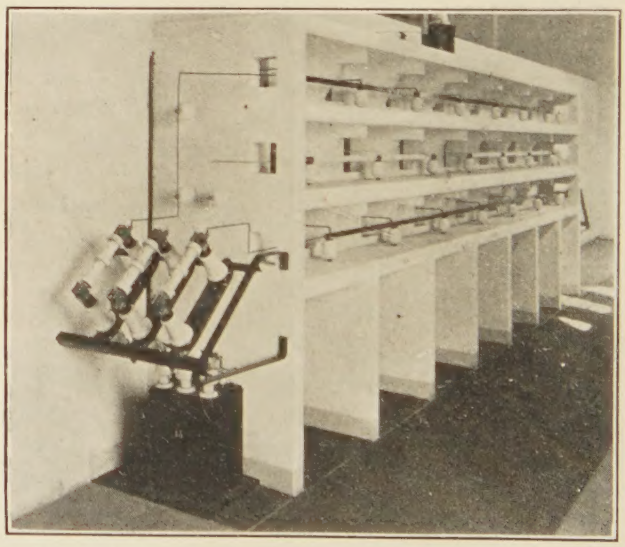
SUBSTATIONS

The equipments of the substations of Rákosszentmihály and of Gödölló are very similar. The same type of motor-generator is used in both, the only difference being in the number, three being now installed at Rákosszentmihály and two at Gödölló. The storage batteries are in proportion to the motor-generator capacity of each substation. Each machine set consists of a 10,000-volt, three-phase induction motor and a commutating-pole d.c. generator of 500 kw output at 1100 volts and 410 r.p.m.

An automatic reversible booster set of the Pirani type is installed in each substation to raise the battery voltage. The batteries are of the Tudor type and consist of 484 cells each, arranged on two floors. The one-hour capacity of the battery is 750 amp-hours at Rákosszentmihály and 450 amp-hours at Gödölló.

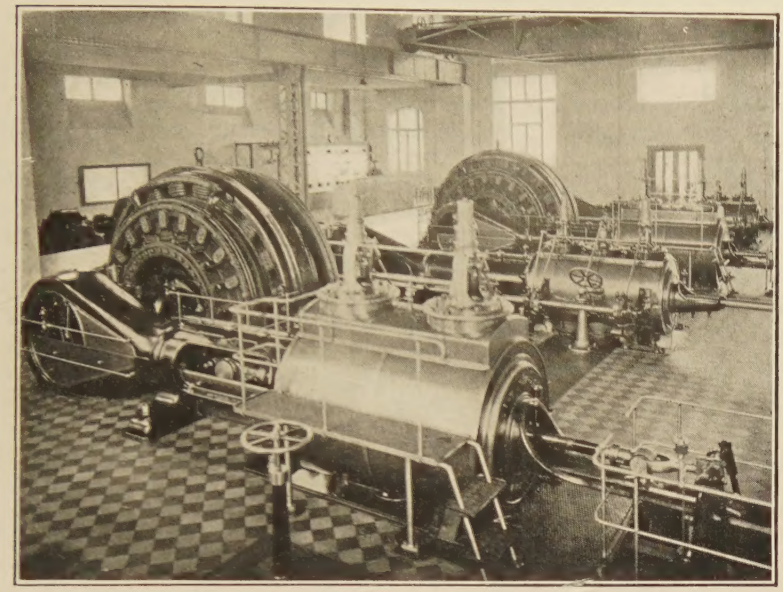


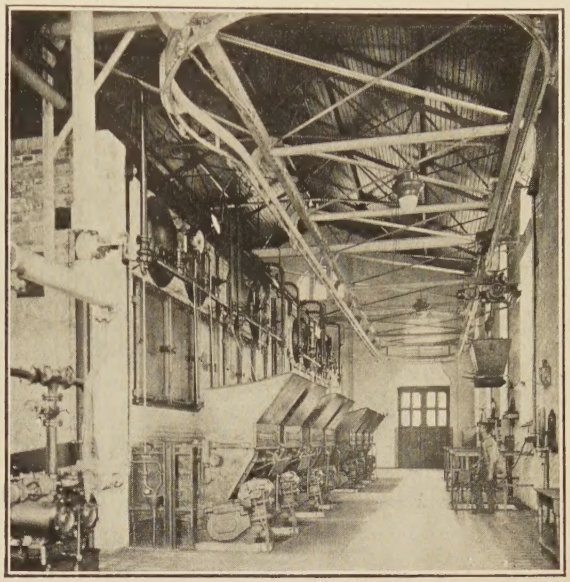
Budapest Railways—Benchboard, Czinkota Power Station



Budapest Railways—High-Tension Cells, Czinkota

The switching apparatus is arranged like that of the Czinkota generating station, an additional detail being the high-tension direct-current switches and exciting rheostats, which, with their connections, busbars and auxiliary equipments, are located in the basement. By this arrangement the high-tension exciting rheostats can be operated from the benchboard above by means of chain drives. The



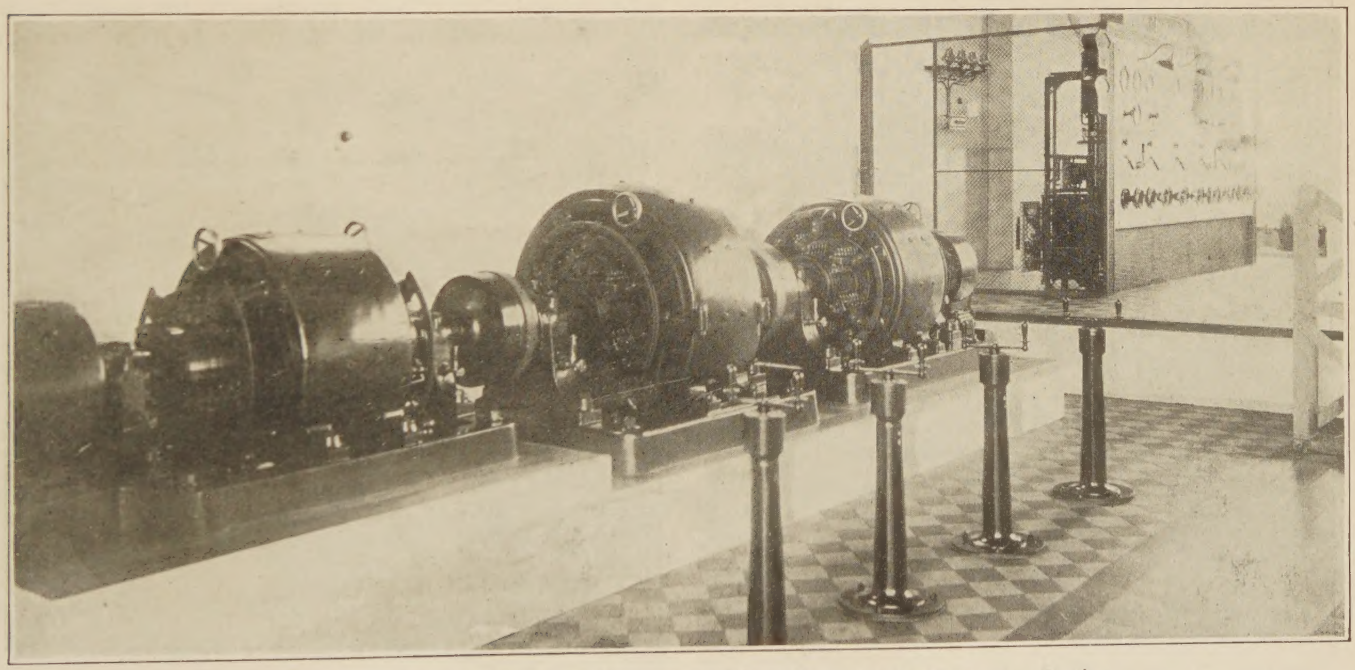


Budapest Railways—Soroksár Engine Room and Czinkota Boiler Room

10,000-volt oil switches, transformers, lightning arresters, etc., with their connections, are arranged on two floors in separate compartments behind the benchboard and are similar to analogous details in the power plant. The benchboard built on a slightly raised platform carries all measuring instruments, the low-tension switches for the remote control of the 10,000-volt and 1000-volt switches, the signal lamps, the hand wheels of the exciting rheostats, etc.

Among the details of special interest within the substation are the oil switches of the 10,000-volt, three-phase motor primaries, which are of the "step-switch" type, having an intermediate transitory position in which carborundum resistances of high value are put in circuit so as to moderate the static strains on the stator windings. Another detail of interest is the construction of the 1000-volt d.c. switches, which are similar to the well-known 750-volt G. E. pattern switchboard type, differing only in size. These switches are also arranged for automatic break with time-limit and maximum-limit action and are actuated by remote control. The current for this is produced by a 1000-volt to 110-volt d.c. motor-generator set fed from the battery and arranged to take over also the duty of the substation lighting, should the three-phase power fail.

The substations, as has been said, are connected to the power plant by 10,000-volt, three-core underground cables laid along the track. The cables are duplicated in case of breakdowns. A telephone cable of several cores, which



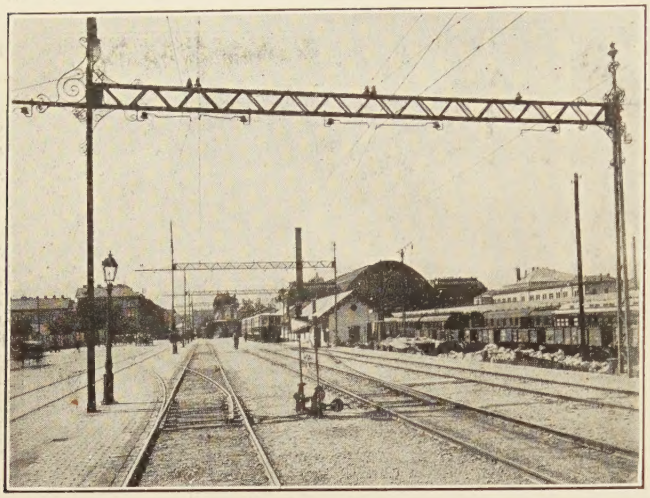
Budapest Railways—Booster Set and Control Board at Soroksár Power Station

serves also for cable measurements, if needed, is laid together with the power cables.

THE SOROKSAR POWER STATION

The engine-room of the Soroksár power station contains two 1100-hp cross-compound condensing steam engines, each of which drives by means of the same shaft one 840-kw, 600-volt, and one 350-kw, 450-volt, d.c. commutating-pole generator. This twin arrangement was chosen in

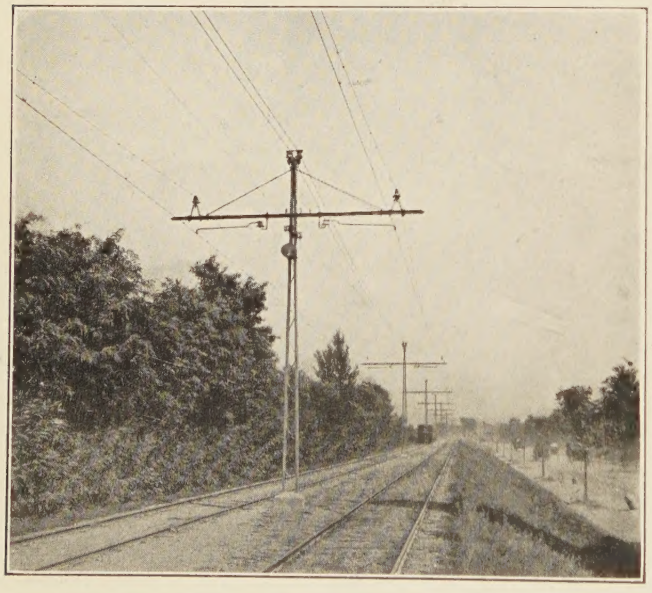
order to be able to feed from the same power station both the 600-volt section from one machine and the outer 1000-volt sections from two machines in series. In connection with the twin generators, two separate storage batteries are installed in another part of the building. The 600-volt battery consists of 290 cells of 960 amp-hours capacity at



Budapest Railways—Catenary Bridge Construction at Stations

the one-hour rating and the 450-volt battery of 215 cells of 450 amp-hours. Each battery has its own automatic Pirani reversible booster, both driven by a 600-volt commutating-pole motor. This equipment is in one corner of the engine room. A small voltage-dividing "dynamotor" set serves to transform the 600-volt d.c. voltage to 220 volts for the lighting of the power plant and for the motors of the coal-handling equipment.

The switching gear is built on the same principles as the equipment at Czinkota and the substations. The switches, circuit breakers, generator exciting rheostats, busbars, etc.,



Budapest Railways—Double-Bracket Construction with Incandescent Lamp on Pole

are located in the engine-room basement, an arrangement which gives the shortest connections between generators, batteries and feeders. The switches, circuit breakers and to some extent the busbars are divided by incombustible "Duro" partitions, and the circuit breakers are actuated by remote control. The exciting rheostats are actuated by chain-wheel transmission from hand wheels on the bench-board immediately overhead in the engine room. Behind the benchboard is a vertical switchboard, upon which the instruments, switches and rheostats for the control of the batteries and reversible boosters are located.

The condensing equipment is also located in the engine-room basement. The air pumps are directly driven from the low-pressure piston rods. The injection water of the condensation is cooled by a Worthington cooling tower and is kept circulating by one of two centrifugal pumps driven by 600-volt d.c. commutating-pole motors. Only the water lost by evaporation has to be supplied from a pumping station on the river bank about 3300 ft. from the power house. A cold-water storage basin is located in the ground beside the cooling tower.

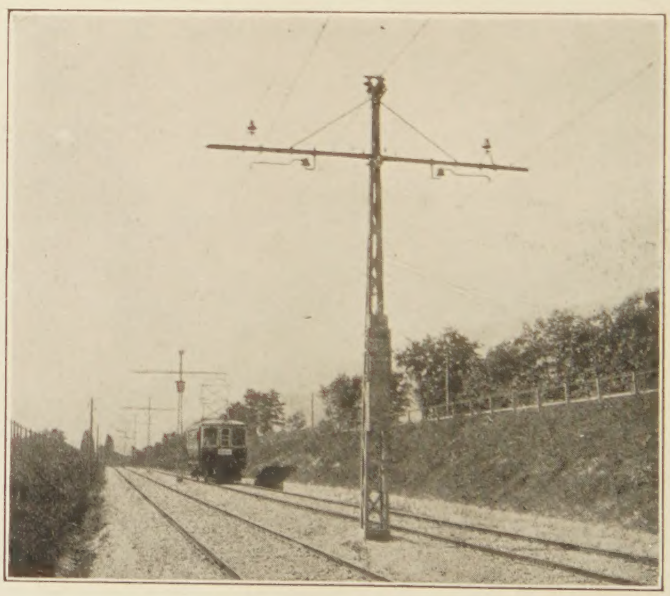
The boiler room now contains three B. & W. boilers of 2700 sq. ft. heating surface and 650 sq. ft. superheater surface each. The traveling chain grate has a surface of 70 sq. ft. A Derveaux feed-water cleaner and three steam-driven Worthington-type pumps are placed beside the boilers. The coal and ash handling equipment is similar to that of Czinkota, but, considering the smaller quantities to be handled, the equipment is confined to the boiler room. The unloading of the coal from the cars into the bunkers is done by hand.

SZENTENDRE POWER STATION

The Szentendre power station, which is under construction, will contain two 1000-kw steam turbines driving 1100-volt d.c. generators. A storage battery and auxiliaries, as well as switching gear, of the same kind as those hereinbefore described, will be provided.

LINE EQUIPMENT

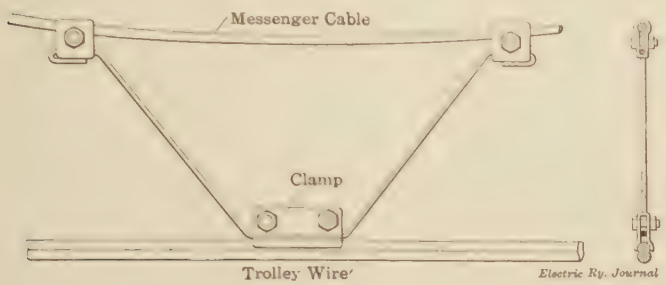
The overhead wiring is carried on steel poles and at stations upon frame girders bridging all tracks. The catenary type of suspension was demanded by the authorities. After various studies and experiments the railway management adopted a construction having the de Fischer-Jellinek system of automatic tension regulation for the trolley wire. This system permits a considerable saving in first cost over other catenary lines and is much simpler than the automatically regulated systems so far known. It may be stated here that



Budapest Railways—Center Pole Carrying the Tension Regulation Weights

it has proved very easy and inexpensive to maintain. The automatic tension regulation is secured by weights attached to the ends of the trolley wire conveniently sectionalized about every 3300 to 4000 ft. The principal feature of this construction is the novel and simplified means for obtaining a movable copper trolley wire in connection with a rigidly supported messenger cable.

In this system, which was first used on the Budapest local railways, the trolley wire is suspended from the messenger cable by means of clamps which do not grip the trolley wire tightly, but fit loosely into the groove of the wire, allowing the wire to slide through the clamp. To prevent it from traveling along with the trolley wire, the clamp is hung from the messenger by two wires instead of one, the two wires running up obliquely from the clamp to the messenger in the form of the letter V. This two-part suspension wire is passed between the halves of the sliding clamp in such a way as to prevent the closing up of the halves against the trolley wire. This arrangement assures the easy sliding of the trolley wire within the clamp and



Budapest Railways—Triangular Catenary Suspension

permits of free play according to the changes of temperature.

The messenger is a steel cable of 42 mm², or about 84,000 circ. mils, and the trolley wire is an asymmetric figure 8 section of 200,000 circ. mils. The insulation of the messenger and of the trolley-wire steadying arm is obtained by the use of the same type of double-petticoat, clock-shape porcelain insulator, which carries an upper petticoat of tin as a protection against mechanical injuries. Both the steadying arm and the insulating support of the messenger may be easily shifted along the pole bracket.

A second insulation is provided by stabilite bushings around the bolts by which the messenger support and the steadying arm are fastened to the bracket.

As the wire of one section is insulated from the following section at each point of tension regulation, this circumstance is used for the electric sectionalization of the trolley line. The line is fed at such points from the feeders by a couple of knife-switches.

Budapest Railways—Double-Bracket Center Poles with Section Switches

A lightning arrester is installed in each section.

The height of the trolley line varies from 15 ft. to 20 ft. The spans in tangents are from 150 ft. to 165 ft., with one maximum of 197 ft. The distance between the V-shaped hangers averages 13 ft.

The feeders are carried on top of the poles upon insulators of the same type as those for the trolley wire. The feeders are copper cables of 300,000 circ. mils section, of which one or more are carried on each pole, according to

Budapest Railways—Standard Motor Car

the circumstances. The ground return is formed by the tracks, bonded by protected rail bonds of 200,000 circ. mils section. A cross bond of the same section connects the rails of the track every 500 ft.

TELEPHONE AND TELEGRAPH CIRCUITS

The telephone and telegraph wires are carried on the same poles as the power wires on porcelain insulators placed upon the bracket near the pole. An overhead metallic return is used. Because of the high trolley voltage, special connections are used between the telephone and telegraph apparatus and their lines, to prevent the possibility of shocks to the operators.

LIGHTING OF STATIONS AND STOPPING PLACES

The lighting of the station yards and of the stopping places is done from the trolley wires by groups of five 200-volt lamps or of ten 100-volt lamps, applied to brackets or to the overhead girders of the stations.

Budapest Railways—300-hp Locomotive and Freight Train in the Main Yards

CARHOUSES AND OTHER BUILDINGS

On the Dunaharaszti line there are carhouses at the Budapest terminal station, at Dunaharaszti and on the branch line to Csepel. On the Gödölló line the chief carhouse is at Czinkota. This is built entirely of reinforced

concrete and is capable of storing fifty-six cars on eight tracks. Its length is 262 ft.

The carhouse contains also a repair shop, stores, offices, etc. Another smaller carhouse at Gödölló is designed to hold the few cars of the last train out.

There is also a painting and car repair house on each line in connection with the chief carhouse. Dwelling houses for the accommodation of the staff are located near the power plants, substations and carhouses.

Budapest Railways—Locomotive Hauling Workmen's Train

ROLLING STOCK

The present rolling stock of the three lines consists of 120 passenger trail cars, seventy-three passenger motor cars and twelve freight locomotives, besides the necessary number of freight cars.

The motor cars and locomotives were built with two radial axles instead of trucks. This construction, which originated in Hungary, has met with much favor in recent years not only in Hungary but also elsewhere on the Continent. In Hungary it may be said to have become the standard construction for electric tramway and railway rolling stock. The advantages of light weight, simplicity and full utilization of the adhesive weight with two-motor equipments have always appealed to the railway companies, while no inconveniences through excessive rail or wheel wear or through diminished safety of operation have been experienced.

The rolling stock of the Budapest local railways is remarkable for the exceptionally long wheelbase, 16 ft. 5 in., which has been used successfully, notwithstanding some very sharp curves in sidings, down to 115-ft. radius. The cars are remarkable for their steady riding up to speeds of 31 m.p.h. The weight of a motor car equipped with two 75-hp motors and hand controller equipment is, roughly, 34,200 lb., or 842 lb. per seat, which compares very favorably with the figures of other recent European cars. Thus on the Cologne-Bonn Railway the weight is 1045 lb. per seat and on the Bernina Railway 1440 lb. per seat. The swivel-truck construction would have meant an increase of weight of from 15 to 30 lb. per seat.

A few other details of the rolling stock should be mentioned. The monitor roof construction has been abandoned, and the ventilating windows have been applied in the side of the car right above the main windows. This change permitted a simpler design and contributed to the saving in weight. The motor cars have sixteen upholstered seats for second-class passengers and twenty-four wooden seats for

Budapest Railways—Carhouse and Yard at Czinkota

third-class passengers. Besides this, standing accommodation for twenty passengers is allowed on the front and on the back platforms.

The cars are equipped with eight brakeshoes and Böker airbrakes. The sanders, whistle and signal bell are actuated by compressed air. Compressed air at a pressure of four atmospheres is produced by an axle-driven compressor on thirty-five cars, which have hand control. On the rest of the motor cars and on the locomotives, where multiple-unit control is used, Christensen motor compressors are employed, producing air at a pressure of six atmospheres, which is reduced to four atmospheres by a reducing valve. The motor compressor is controlled by an automatic switch governor. The brake coupling is carried out in duplicate on account of the central passage between the cars. An emergency brake valve is applied to every trailer car so that the train may be stopped from any trailer if necessary. The car-coupling arrangement is of some interest, as it unites the features of the central bumper tramway type and the swinging type used on steam railways.

The locomotive construction is similar to that of the cars. The closed box-shape body used is divided into three partitions. Of these the central partition is available for freight parcels, while the other two form the control platforms, which also contain most of the multiple-unit control equipment accessories. The locomotives have two swinging axles, like the cars. Scrap-iron ballast gives the locomotives the weight required for traction.

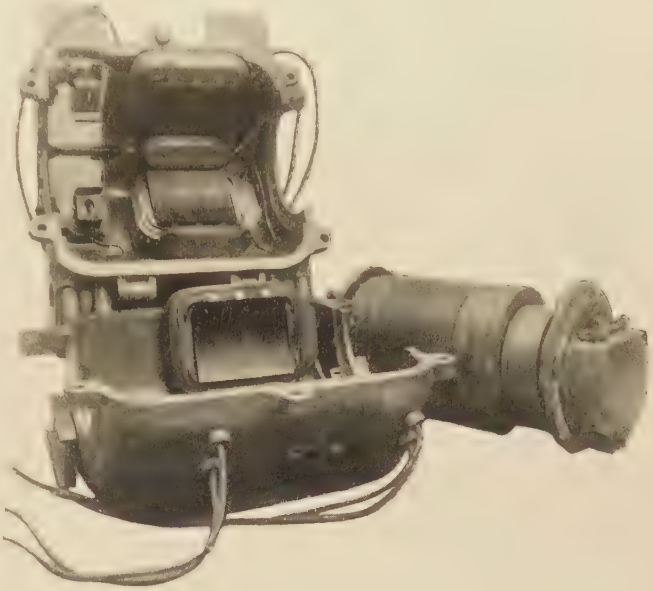
The equipment of the cars differs according to the service. For the lighter service and on level sections single-motor cars, with hand control and two 75-hp motors, have been adopted. For heavier traffic multiple-unit control equipments are used but with the same 75-hp motors, thus allowing a prompt doubling of the train unit if desirable. On the Gödölló line, however, the character of service and heavier grades require two 110-hp motors per car with multiple-unit control. The locomotives, which are used for freight and for hauling extra heavy passenger trains, especially workmen's trains at certain hours, have two 150-hp motors each and multiple-unit control. In all, the electrical equipment of the cars, exclusive of trailers, is made up as follows: Thirty-five motor cars, with two 75-hp motors and hand control; twenty cars, with two 75-hp motors and multiple-unit control; eighteen cars, with two 110-hp motors and multiple-unit control, and twelve locomotives, with two 150-hp motors and multiple-unit control.

Besides this fifteen motor cars of the first type are operated by a connecting railway over one of the branches of this system.

MOTORS

The motors, except for size, are all of the same construction. They are built for the full line voltage of 1000 volts and have commutating poles with diagonally split cases. The bearings are in circular shields which are large enough to allow the armatures to be rolled on the floor without coming into contact with it. The armature and field coils are carried out according to the best current practice, and therefore little need be said here about these details.

The motor-shaft bearings are of the ring-lubricated type and have satisfied all expectations. No difficulties, like loss of oil from the reservoirs or sticking of rings, with consequent damage to the journals, have been experienced during the one and one-half years since the first cars began regular service. Neither has the oil penetrated into the inside of the motor. The bearings of the car axles have drop feed lubrication, as it would have been very difficult to apply the ring construction to them.



Budapest Railways—75-hp, 1000-Volt Commutating-Pole Motor

The 75-hp motors are geared in the ratio of 1 to 3.3 and the others 1 to 3.5. All motors are suspended from the underframe beams by the gravity center-suspension system by the use of two cross beams which support the motors at two points below the axles and in turn are suspended from four double-acting helical suspension springs.

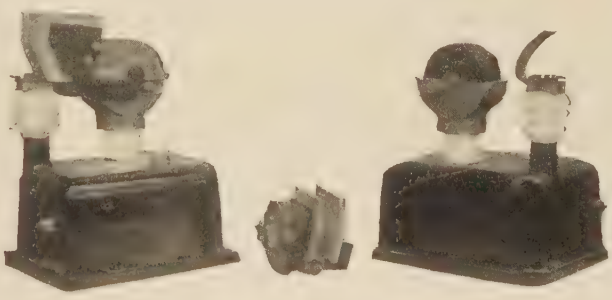
The motor weights, inclusive of gearing and gear case, but without suspension, are as follows: 75 hp, 3640 lb.; 110 hp, 5000 lb., and 150 hp, 5470 lb.

EQUIPMENT FOR HAND CONTROL

The equipment of the motor cars with hand control is quite analogous to that used in ordinary tramway cars, differing mainly in constructive details on account of the higher voltage. It consists, besides the motors, of the following apparatus: Two hand controllers, one automatic circuit breaker, type B. F. Z., two cut-out switches, two main safety fuses, one lightning arrester, one set of starting resistances and one current collector.

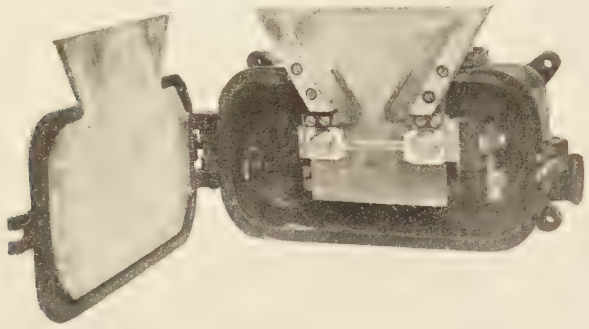
The type B. F. Z. hand controller differs from the standard 500-volt to 600-volt type mostly by its ampler dimensions since greater arc distances are required at 1000 volts. Its weight, 550 lb., is also correspondingly greater. The

Budapest Railways—Multiple Unit Train Composed of Two Motor Cars



Budapest Railways—Type of Lightning Arrester Used on the Motor Cars

controller contains three contact cylinders, namely, the reversing, running and motor cut-out cylinders. The last differs from American cut-out switches in being located outside the controller and alongside the running and reversing handles. It should be noted that the separate braking drum, common in European practice, is missing. Instead an ingenious mechanism makes the reversing cylinder



Budapest Railways—1000-Volt Safety Fuse Box

available for the braking connections, and thus one cylinder and several fingers are saved.

The automatic circuit-breakers, cut-out switches, safety fuses and lightning arresters are also similar to 600-volt apparatus, except for the larger arc gaps. Two safety fuses are employed, one in each pole, because the cars eventually will enter the city over tracks where the underground conduit system with both conductors insulated is in use. For the same reason the car couplers for electric light and heating had to be made two-pole. The single circuit breaker is placed purposely underneath the car body to render its manipulation inconvenient with a view to training the men to handle their car with care, and so keep them from lightly risking the opening of the circuit breaker.

The current collector is of the pantograph type, with a separately swiveled smaller bow on top of the pantograph. The freedom of this type from the influence of the wind renders possible the use of very low bow pressures, with the consequence of very little wear both of the bow and of the trolley wire. One of these current collectors is used on each motor car and two on the locomotives, to be described later.

The starting resistances are of the usual 600-volt type, but with additional insulation. The lighting is done by ten 110-volt, 25-cp lamps in series. The lamp socket and base are of special construction to enable them to withstand the 1000-volt potential appearing at the lamp terminals in case of a lamp failure. The lamp socket is entirely inclosed in an insulating cover.

As the line potential on one section is only 600 volts, and furthermore as it is contemplated that the cars should enter the city in the future on the 500-volt city lines, an electro-magnetic automatic commutating switch has to be used, which will connect the lamps in two series of five lamps each for the lower voltage and in one series of ten lamps for 1000 volts. In case of zero voltage the 1000-volt connections are maintained for safety.

The cars are heated by "Electra" type heaters, of which two series of two heaters each are used.

Current-time clocks of the Hartmann & Braun type are installed to measure the aggregate time during which the motors are under current and to furnish data by which to judge and reward the ability of the motormen.

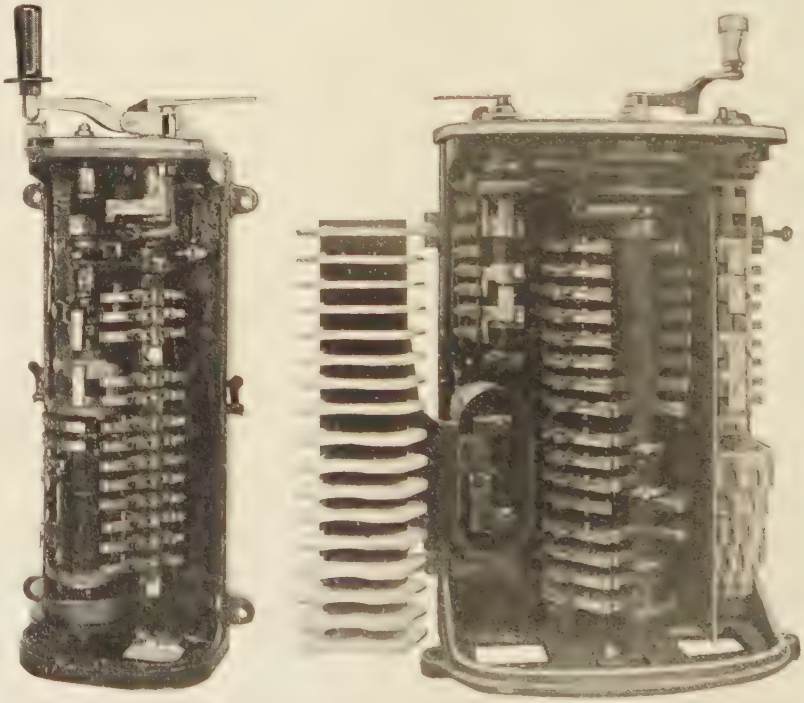
MULTIPLE-UNIT CONTROL.

Twelve locomotives and thirty-eight motor cars are equipped with multiple-unit control. As the equipment of the locomotives and of the motor cars, apart from the motors, differs but slightly, the following description will be confined to the motor cars:

Twelve contactors and a reversing switch are used for the various connections. These contactors are actuated by solenoids, fed with a current of 80 volts, furnished by a couple of 500-volt to 80-volt converters of about 500 watts output each, coupled in series on the primary side. When running on the 600-volt section the converters are operated in parallel. The change over is done by an automatic commutating device similar to that of the lamp circuits. The contactors are controlled from master controllers placed in the cables. The other auxiliary apparatus includes automatic circuit-breaking relays, one for each motor, motor cut-out switch and train coupler. The converters are combined with a separate cut-out switch, by which any of the two may be thrown out of circuit in case of failure and replaced by a conveniently connected resistance in such a way that operation might be continued with the remaining converter.

The contactors are arranged underneath the car body, in three boxes, four contactors per box. The contacts are pieces of solid copper, making contact with a slight rubbing motion. The actuating solenoid and the blow-out coils are on the back.

The reverser is a contact drum revolving between two rows of contact fingers under the action of two solenoids, one for each running direction. The master controller consists of two cylinders, one for reversing, the other for the series-parallel control. The operation of this master controller shows some interesting points. The main cylinder, namely, that for the series-parallel points, is connected to a strong coil spring, which tends to bring it back to its initial position. The main handle, instead of being applied directly to the shaft of the main cylinder, actuates a ratchet mechanism by which the main cylinder can be moved forward by one point every time the main handle is swung forward through an angle of about 30 deg. At the back-



Budapest Railways—Master Controller and Ordinary Controller

ward swing of the controller handle the main cylinder remains at the running point to which it had been notched up. Thus the full series of starting points is accomplished by ten pairs or cycles of forward and backward swings of the main handle. This ratchet action achieves the same end as the various controller regulators inasmuch as the motorman is prevented from making excessively rapid

starts. In the "running" position the handle rests against a slightly raised stop in the top of the controller, so that the weight of the motorman's hand suffices to hold it there. For switching off the current the motorman has only to let go the handle, when it will be swung backward by a spring which exceeds the resistance of the stop previously mentioned, so freeing the ratchet mechanism and allowing the main cylinder to spin back into the initial position.

The maximum cut-out relay is simply a solenoid inserted in the motor circuit. When the current exceeds a certain maximum value this relay will open a contact and interrupt the control current. A voltage coil upon the same solenoid core is placed under current in the "out" position of the relay and fixes the relay there until the master controller is brought back into its initial position. One relay is used for each motor.

The control current converter is a small machine with two independent armature windings and two commutators, one for 500 volts, the other for 80 volts. The field is excited from the 500-volt side. A permanent resistance is inserted in series with the armature, as the converter must not cut in instantaneously. The main safety fuse, lightning arrester and current-collecting device are the same as those of the hand-control cars. The motor cut-out switch is a contact drum between two rows of contact fingers and needs no further description.

The multiple-unit car equipments are furnished with one main-current ammeter and one control-current (80-volt) voltmeter per cab. The voltmeter, according to the converter transformation ratio, gives also a fair indication of the line voltage.

OPERATING RESULTS

The results of operation so far have been very satisfactory indeed. No detailed figures are available, but a few characteristic data may be given.

The commutating-pole motors operate excellently. After running for one and a half years on the Dunaharaszti line and for nearly a year on the Gödölló line the carbon brushes show a wear of only between 0.04 in. and 0.06 in. The commutator wear is negligible. In one case it has been necessary to polish up the commutator with carborundum linen, but this was due to external causes. Only one motor armature has required repairs. No field coil repairs have been needed so far. The yearly run of a motor car is between 28,000 and 40,500 miles.

The oil for the ring-lubricated armature bearings is renewed every five weeks on the average, and every fortnight the bearings are filled up. The oil taken from the bearings is used for the lubrication of the gears. The total oil consumption per motor is about 11 lb. per month. The bearings show a wear of about 0.012 in. in one year. Only one bearing had to be babbitted again, the abnormal wear being attributable to external causes.

The hand controllers show an excellent record. Not one finger or contact ring has been renewed, and no maintenance except an occasional clean-up has been required.

The record of the multiple-unit control equipments is comparatively short, and therefore no final results can be quoted. However, it may be said that the system has made a good showing so far. The ½-kw converters have needed practically no care or maintenance, thus being far superior to battery systems for producing the control current.

The record of the pantograph current collector shows an average life of 12,500 miles for the aluminum contact bow, with hardly any wear at all on the trolley wire. This very favorable result is due to the low trolley pressures which may be employed with this type of current-collecting device in a compensated catenary suspension, on account of the uniformly constant tension on the trolley wire.

The trolley line gave entire satisfaction, the de Fischer-Jellinek type of catenary suspension having given good proof of its value. Not one interruption of the service was due to it, although the overhead construction was subjected to unexpected severe stresses through freight trailers derailing and damaging the supporting poles of the overhead structure. It may be added that a mixed electric and steam freight service was operated for a time. It might be mentioned here also that this system of catenary suspension has since been adopted for the Ueberetscherbahn in Tyrol, Austria, where it has been in operation with a line voltage of 1200 volts since July last on one section, upon which the trains of the Austrian State Railways are doing regular service by steam, and also for the Arad-Hegyalja Railway, Hungary, which is to be completed during this year and where the line potential will be 1500 volts.

The power station and substations on the Dunaharaszti and Gödölló lines require little mention under this heading. Still it is satisfactory to note that the 1100-volt dynamos and the switching apparatus up to sizes of 1500 amp and 1100 volts have worked very well.

As to energy consumption figures, the energy required per ton mile varies between 80 watt-hours and 96 watt-hours, measured on the 1100-volt d.c. busbars, including also car lighting, car heating, line losses and the current required for the carhouses and for the lighting of all stations and of the line itself.

The fuel consumption at the power plants averages 4.85 lb. of coal per kilowatt-hour on the direct-current busbars at Soroksár and 4.85 to 5.1 lb. at Czinkota, including in the latter case also the three-phase transmission and conversion losses. The latter figures are due to the very favorable steam consumption of the turbines. The coal used has a calorific value of 7800 b.t.u. per lb. These figures are subject to betterment, as the load conditions will improve with the expected increase of traffic.

ENGINEERING

The electric equipments for the rolling stock and the electric generators, and motor-generators in stations and substations have been furnished by the Ganz Electric Company, Ltd., Budapest; the car bodies and the line equipment under the direction of Marcell Jellinek, by the Gép és Vasutfelszerelési Gyár R. T. (Machine & Railway Supply Company, Ltd., Budapest); the switching apparatus of the generating stations and substations by the Unió Magyar Villamossági R. T. (Hungarian branch of the Allgemeine Elektricitäts Gesellschaft, Berlin); the high-voltage storage batteries by the "Tudor" Accumulator Works Company, Budapest; the steam engines and turbines by L. Láng, Budapest, and smaller contracts have been placed with a number of various firms.

The work was undertaken and carried through under the management of Henry de Jellinek, president and general manager Budapest Local Railways Company, and of the company's inspector, Julius Fischer de Tóváros, chief of the electrical department, who proposed the employment of the high-tension d.c. system, controlled its installation and is now supervising the electrical operation of these railways. The installation work on the part of the Ganz Electric Company was carried out under the direction of William C. Gyáros.

In 1873, when the greatness of the city began to be realized, the tramways of Buenos Aires carried 13,156,350 passengers. Ten years later, when municipal transportation had not passed beyond the period of horse cars, the total number of passengers carried by the road was augmented to 17,965,437. A decade later, owing to the increased population of the city, 57,799,362 passengers were carried. With the change from horse cars to electric cars came a great improvement and extension of the systems in all their ramifications, and the number of passengers carried multiplied beyond the most sanguine expectations. During 1911, 355,531,182 passengers made use of the facilities offered, the companies receiving $14,969,446 (United States gold) in fares.

Increase in Fares on Illinois Railway

Changes in Rates on 9-Mile Interurban Line of the Galesburg & Kewanee Electric Railway—Traffic Affected by Unsatisfactory Business Conditions—Analysis of Weekly Traffic Made

The Galesburg & Kewanee Electric Railway, which operates 5 miles of city track in Kewanee and 9 miles of interurban track connecting the cities of Kewanee and Galva, Ill., increased its interurban rates of fare in 1911 because of a clear need of additional revenue to offset a depressed condition of business. The causes underlying the increases in fares of this company are similar to those that have led other companies in the Central West and in certain sections in the East to make like changes.

The road commenced operation in 1903, and the hope of its projectors for an adequate revenue from traffic has been disappointed. The unsatisfactory financial results have been accentuated by the development of an unexpected and prolonged reduction in traffic which followed the panic of 1907. An increase in rates of fare was made in the hope of effecting by this means an improvement that would overcome the effect of the reduced traffic and the higher expenses which have been experienced by this company in common with all others.

Table I—Income Account for Twelve Months Ended Feb. 28, 1911.

Total city revenue	$35,913.47
Total interurban revenue	39,567.45
Total revenue from transportation	75,480.92
Total revenue from other operations	1,275.92
Total operating revenue	$76,756.84
Total operating expenses, includes $12,000 depreciation	59,243.55
Net income from operation	$17,513.29
Miscellaneous income	181.16
Gross income, less operating expenses	$17,694.45
Deductions from income—	
Interest on funded debt	$20,000.00
Interest on floating debt	685.45
Taxes	2,769.76
Total deductions from income	$23,455.21
Loss	$5,760.76

The report for the year ended Feb. 28, 1911, which preceded the change in fares, is given in Table I, published herewith. It shows a total operating revenue of $76,756 and total operating expenses, including an allowance of $12,000 for depreciation, of $59,243, or an operating ratio of 77.2 per cent. After provision for the fixed charges and taxes there was a deficit of $5,760. The loss, therefore, on the operations in the entire year was equal to 7.5 per cent of the total operating revenues.

R. H. Hayward, the general manager, who had decided to make increases in certain interurban rates of fare, computed the possible results from a change in schedules before announcing the plan under consideration. He analyzed the traffic results for one week and applied to the detailed returns thus shown the increased rates of fare which he had decided to make. The result, assuming that the same number of passengers used the same number of tickets under the new plan as under the old, would be an increase in the weekly return from $605.63 to $660.62, or $54.99. This is equivalent to 9.1 per cent. Table II, published herewith, shows the data on which the increased rate was figured, taking as a basis the collections for one week. It will be noted that the possible increases computed in the separate classes of fares are very small and that each one involves only a slight gain even on the assumption that no decrease in the traffic would result from the change of rates.

The increase of 9.1 per cent on the operations of a week, if applied to the interurban passenger returns for the full year, without allowance for the difference in traffic during varying seasons, would indicate a gain of $3,266.78, the total interurban passenger revenue during the twelve months ended Feb. 28, 1911, being $35,898.63. A gain of 9.1 per cent on this amount would have reduced the loss shown from $5,760.76 to $2,493.98.

The action of other companies in a similar position was investigated. Increases had been made in the rates of fare of the electric railways in which Clement C. Smith, of Milwaukee, Wis., is interested. Among these lines is the Sterling, Dixon & Eastern Electric Railway, of Dixon, Ill. The example of this company in making an increase in the rates was therefore before the officials of the Galesburg & Kewanee Electric Railway and influenced them in their action. The increase in rates on the Sterling, Dixon & Eastern road was made effective on Sept. 15, 1910. Mr. Hayward issued his announcement to the patrons of the Galesburg & Kewanee Electric Railway Company on Feb. 21, 1911, stating that an increase in rates would be made. He included in the announcement part of the statement of reasons given by Mr. Smith to the patrons of the Sterling, Dixon & Eastern road. The announcement made by Mr. Hayward says in part:

ANNOUNCEMENT TO PATRONS

"The relation of receipts to expenses has been a constant source of anxiety to the directors of this company since the first car was started in 1903, for at no time in its history has a dividend been earned to compensate the stockholders for the hard cash, time and labor expended in the organization, construction and operation of the property. For a while there were grounds for hope that a dividend might ultimately be paid, but the greatly reduced revenues of the past three years have destroyed even that source of satisfaction. As the public knows, the company has been obliged to pay since the spring of 1910 higher prices for labor and for coal than ever before, the effect of which, in connection with higher prices for other items entering into the cost of operation, has been to increase expenses at the rate of several thousand dollars annually and to render the financial problem still more difficult for the company.

"The result of the conditions above mentioned—reduced receipts and increased expenses—is that not only has the company not been able to pay dividends, but it has not even earned sufficient revenue above current expenses to maintain its property in good condition and to provide for the depreciation which is constantly taking place and which will necessitate the purchase of new cars, dynamos, engines, boilers and other equipment when the old property is com-

Table II—Data Showing Actual Increase Made Figured on the Basis of One Week's Collections

	Cents	With Old Rate	Cents	With New Rate
Special tickets	55			
Transfers	37			
Round trip, full fare	338 at 12½	$42.50	at 15	$50.70
Round trip, half fare	8 at 6½	0.52	at 7½	0.60
Single trip, full fare tickets	441 at 18	79.38	at 20	88.20
Single trip, half fare tickets	7 at 9	0.63	at 10	0.70
Weekly tickets	635 at 12½	79.38	at 12½	79.38
Mileage	232 estimated	23.20	estimated	24.75
Commutation	51 at 4	2.04	at 4	2.04
Five-cent fares, cash	339 at 5	16.95	at 5	16.95
Nine-cent fares, cash	19 at 9	1.71	at 10	1.90
Ten-cent fares, cash	291 at 10	29.10	at 10	29.10
Fifteen-cent fares, cash	55 at 15	8.25	at 15	8.25
Eighteen-cent fares, cash	1,728 at 18	311.04	at 20	345.60
Duplex tickets:				
Thirteen-cent	76 at 13	9.88	at 15	11.40
Ten-cent	4 at 10	0.40	at 10	0.40
Five-cent	13 at 5	0.65	at 5	0.65
No cents	5			
Total	4,334	$605.63		$660.62
				605.63
Gain				$54.99
Per cent of gain				9.1

pletely worn out. This is a condition of affairs that cannot continue indefinitely. A property which cannot make both ends meet soon reaches the point where it cannot borrow money to make up the deficit. When that point is reached it may try to struggle along by lowering its standard of service, by making no expenditures for new equipment, even when needed, and by avoiding any repairs on cars, track or other parts of the property that are not absolutely necessary to enable the wheels to turn, all of which measures are demoralizing to the company and disgusting to the public which depends upon it for service. If these measures fail, then the plant is closed down and the public gets no service of any kind.

"This company does not desire to follow the course above indicated and believes that its patrons do not desire it to do so. The company desires to give, and believes its patrons want, the best service that is possible under our local conditions. Such service, however, can be given only if the revenue is adequate, and it is to this problem of providing adequate revenue that the directors have given serious consideration. This problem is not a new one to the electric railways of the United States. Particularly is it not a new one to small systems like the Galesburg & Kewanee. The older lines in the Eastern part of the country have found their revenues insufficient to provide for making the necessary repairs and renewals of their properties and have raised rates, even city fares being increased from 5 cents to 6 cents with the approval of the state commissions. Electric railways in the Middle West, some right in Illinois, have had the same experience and have adopted the same remedy. Promoters and financiers of electric railways have had the idea that by means of the new form of traction passenger service could be furnished profitably at much lower rates than prevailed on the steam roads, but costly experience has proved their confidence to be unfounded and has resulted in the original low rates being increased and fewer electric railways being financed and built recently than was the case ten or even five years ago.

"Some remedy for the financial situation in which this company finds itself is imperatively demanded, and the directors have been forced to the conclusion that the most practicable remedy is an increase in the fare between Kewanee and Galva and have decided upon the following changes in rate, to take effect Wednesday, March 1, 1911: One way, full fare, from 18 cents to 20 cents; one way, half fare, from 9 cents to 10 cents; Sunday round trip, full fare, from 25 cents to 30 cents; Sunday round trip, half fare, from 13 cents to 15 cents; mileage books from $3.75 to $4.

"The company feels that its action in making this small advance in interurban rates is fully justified under all the circumstances and would invite attention to the following points:

"1. The company's franchises permit it to charge a 5-cent fare for the 2.21 miles which are partly within the city limits of Kewanee and Wethersfield, and the same is the case for the 1.01 miles within the city limits of Galva. The mileage from the west limits of Wethersfield to the east limits of Galva is 5.83 miles, and, assuming the 2-cent fare law to apply, a charge of 12 cents is warranted for this distance. On this basis a total charge of 22 cents is justified for the entire distance of 9.05 miles.

"2. Transfers between the Kewanee city cars and the interurban car are furnished without extra charge, enabling passengers to ride 1¾ miles additional on the city cars in two directions, or a total of 10¾ miles. This mileage, assuming the 2-cent fare law to apply, would justify a rate of 22 cents.

"3. The Railroad Commission of Wisconsin has held that the 2-cent fare law of that State does not apply to the electric railways, and it is questionable whether the corresponding Illinois law applies to the electric railways of this State. The law was designed primarily for regulating the passenger rates of the steam roads. The steam roads do not render the same class of passenger service that the electric lines do. Furthermore, the passenger revenues of the steam roads average only about 25 per cent of their total earnings, whereas in the case of the electric railways their earnings are practically limited to what they can derive from passenger service. Under these differing conditions, what would be a reasonable rate for a steam road is not necessarily so for an electric line.

"4. The courts hold as unconstitutional laws which seek to establish rates for service that do not enable the servant to earn a fair return upon his investment.

"No one is more deeply interested in the growth and prosperity of this community than the Galesburg & Kewanee Electric Railway Company. All its stockholders are residents of this immediate vicinity. They have invested a large amount of money in a plant for furnishing transportation, and, unlike the ordinary factory, it is not practicable for them to load this electric railway on cars and ship it to a more favorable location. Here it must remain, whether it be to survive or perish.

"This plain statement of the facts is made because the company believes that if its patrons fully understand the situation they will approve and commend its action as a necessary business proposition and will cheerfully accommodate themselves to it. The company values the respect and friendship of those who do business with it and feels that it will be better entitled to these considerations if it endeavors to maintain its business on a sound financial basis than if it allowed its property to run down and depreciate and clearly neglected what the Supreme Court of the United States has declared to be 'a plain duty to the public.'"

TABLE III—EARNINGS BY MONTHS ON THE INTERURBAN LINE

Fiscal year	Total Passenger Revenue		Total Passengers Carried		Revenue per Passenger Carried, Cents		Car Miles	
	1910-11	1911-12	1910-11	1911-12	1910-11	1911-12	1910-11	1911-12
March	$2,690.26	$2,857.86	18,928	18,836	14.2	15.2	10,086	10,086
April	2,668.87	2,811.95	18,813	18,223	14.2	15.4	10,466	10,666
May	2,628.33	2,977.05	17,468	18,263	15.0	16.3	9,047	11,161
June	2,779.78	3,053.73	19,268	19,682	14.4	15.5	9,756	10,388
July	3,738.38	3,470.95	25,020	22,124	15.0	15.7	10,050	11,018
August	3,286.55	3,628.36	21,934	22,876	15.0	15.8	10,086	11,161
September	3,456.84	3,481.65	22,851	21,605	15.1	16.1	9,756	10,724
October	3,167.43	3,187.50	21,242	20,900	14.9	15.3	10,050	11,082
November	2,892.62	3,011.45	20,506	20,553	14.1	14.7	9,756	10,745
December	3,285.59	3,508.70	22,438	22,855	14.6	15.3	10,086	11,104
January, 1911	2,690.81	2,717.90	19,198	18,671	14.0	14.6	10,050	11,204
February, 1911	2,613.17	2,692.75	18,412	18,052	14.2	14.9	9,096	10,501
Total	$35,898.63	$37,399.85	246,078	242,650	14.6	15.4	118,285	129,840

EFFECT OF THE CHANGES

Supplementing the announcement, Mr. Hayward has made the following statement to the ELECTRIC RAILWAY JOURNAL in reference to the changes in the rates:

"In explanation of the increase in our interurban rates of fare which became effective on March 1, 1911, I will state that the panic of 1907 was followed by a period of industrial depression in Kewanee from which the city has not fully recovered even now. The revenues on both our city and interurban lines were affected seriously. During the same period, however, operating expenses had increased. The payroll, constituting 60 per cent of our total operating expense, including an allowance for depreciation, had been increased by an advance of 10 per cent in the wages of em-

ployees. Fuel, which constitutes 10 per cent of our total operating expenses, had advanced 25 per cent. In the cost of other items of lesser importance corresponding increases had taken place. Under these circumstances it was incumbent upon the company to do everything possible to secure additional revenue, and the advance in interurban rates was the result.

"As to our experience under the new rates, we had estimated that they would produce an increase in interurban passenger revenue of 9.1 per cent, assuming that the same number of passengers could be carried as under the old rates. This result has not been realized during the twelve months which have elapsed since March 1, 1911, as interurban passenger revenue has been but 4.2 per cent greater than for the corresponding period in 1910, the number of passengers carried having decreased during that period 1.4 per cent, and of these passengers a larger number being carried half way than during the previous year.

"On first thought the increase in rates might be considered responsible for the decrease in patronage. So far, however, as we can determine, the traveling public is not patronizing the steam line which we parallel to a greater extent than before, even though our one-way rate is now 20 cents as compared with the steam rate of 16 cents. We believe that the reduction in the number of passengers carried is due to the general slackening in business which commenced to be felt throughout the country about the time new rates were put into effect. We are confirmed in this belief by the fact that other interurban lines in this vicinity experienced a decline in patronage about the same time.

"We endeavored to forestall hostile criticism regarding the increase in rates by explaining very carefully in the newspapers the conditions which rendered this change necessary. We expected some objections from the class of people who look for opportunities to criticise, but were agreeably surprised to find that the new rates were accepted without question. The general public appeared to recognize that the circumstances warranted the action which we took."

On account of the changes in general business and industrial conditions which Mr. Hayward has described, it is difficult to analyze in detail the effect of the changes. As shown in Table II, if the same relative proportions of different rates of fares were used by the various passengers as during the week under consideration, the average revenue per passenger would have been increased 9.1 per cent. Table III, however, in which the returns by months are given, shows that the result of the year's operation was an increase in revenue per passenger carried from 14.6 cents to 15.4 cents. This is 5.5 per cent. The relative proportions which were found in the one week analyzed did not continue therefore throughout the year. This is attributed to the fact that on account of the organization of a new country club the company has carried a larger proportion than ever before of half-way passengers paying only 10 cents, and also of wage earners, who travel each day and use weekly tickets at a rate of 12½ cents per trip.

PUBLIC SERVICE RAILWAY BASEBALL LEAGUES

The employees of the Public Service Railway of New Jersey have made plans for an active baseball season upon a large scale. The platform employees of the northern division have organized seventeen teams, known as the Northern League, while those of the southern division have organized three teams. The schedule, which calls for 136 games beginning Thursday, May 9, and ending Thursday, September 19, was prepared by the time-table department of the company and blueprinted for booklet distribution to interested parties. The playing time of the platform teams has been so arranged that there will be no games on Sundays or holidays or between May 24 and June 4 inclusive, to avoid interference with holiday traffic. The local division superintendents will so arrange the working time of the men that games will begin either at 9:30 a.m. or 1:30 p.m. The teams include quite a number of men who were formerly professional players. To avoid any possible attempt at fraud the name and badge number of every player is checked up from the employment slips.

The men are enabled to buy all baseball equipment at wholesale prices, while the company donates the playing grounds. The two trophies offered for this season consist of a loving cup for the best team, presented by N. W. Bolen, superintendent of transportation, and a ball and bat combination, with an ebony base, presented by Mr. Shepherd. In addition, A. G. Spalding & Brothers, who furnished the baseball equipments, have donated a set of watch fobs which are to be given to the members of the winning team.

Opening of the Public Service Railway's Baseball Season at Hilton, N. J.

Owing to rain, the opening game of the Northern League was played at Hilton May 10 instead of May 9. Upon this occasion 600 spectators were on hand to see the seventeen teams parade across the diamond behind a military band furnished by the company. This game resulted in the defeat of the Hiltons of Essex County by the Greenvilles of Hudson County by a score of 15 to 6. The first ball was thrown by Mr. Bolen. The campaign of the Southern League was opened at Woodlyn Park May 22.

In addition to the teams composed of platform men a number of departmental nines have been organized to play on Saturdays and Sundays. These teams consist of one nine each from the Hudson and Essex claim departments, a clerical, collectors' and solicitors' nine from the gas department, outside and inside men's teams from the electrical department and one team from the office of the transportation department. All the baseball arrangements are in the hands of William H. Shepherd, of the time-table department.

It has been stated that the consumption of electricity per inhabitant is only about one-tenth as great in England as in the United States and that the price in England is about 60 per cent higher than the average price which is paid in this country.

CHICAGO ELEVATED RAILWAYS VALUATION

A number of points have been brought out in the discussions before the local transportation committee of the Chicago City Council in regard to the cost to reproduce the rights-of-way owned by the Chicago elevated railways. As noted editorially in the ELECTRIC RAILWAY JOURNAL of May 18, the principal difference in the valuations was found in the figures allowed for real estate. The two experts practically agreed as to the value of the bare land, but there was a wide difference of opinion as to the amount to be added for land and building damage. The city's expert did not include anything to cover the cost of acquiring the property or for interest and taxes during the construction period.

An analysis of J. Milton Trainer's figures, which were compiled for the railway company, is shown in Table I, published herewith:

TABLE I.—ANALYSIS OF RIGHT-OF-WAY VALUES FIXED FOR THE COMPANIES

Road	Bare Land Value of Real Estate	Value of Realty for Railway Purposes
South Side Elevated	$4,699,731	$11,539,755
Metropolitan West Side Elevated	7,395,402	13,845,234
Northwestern Elevated	3,253,292	5,926,121
Chicago & Oak Park Elevated	541,936	594,546
Total	$15,890,361	$31,905,656
Interest and taxes during construction		5,743,344
Waiver of damages and abutting property on public streets		6,902,498
Total		$44,551,498
Brokerage on real estate and right-of-way		2,227,575
Grand total		$46,779,073

The details of Joseph Donnersberger's figures on real estate values, as compiled for the valuation commission, are shown in Table II.

Of Mr. Donnersberger's total 71 per cent was estimated as bare land value, 12 per cent as damage to land and 17 per cent as damage to buildings.

The discussion between the experts and the members of the committee showed that the city's expert had made his estimates of damage to the various pieces of property in lump sums, while the expert for the elevated railway based his estimates on percentages of the present value of the land left after the right-of-way was taken.

The Mayor and the members of the committee suggested that the new figures be based on the percentage of damages paid when the right-of-way was purchased. Mr. Trainer said that this would be unfair, as the people's

TABLE II.—ANALYSIS OF RIGHT-OF-WAY VALUES FIXED BY CITY REPRESENTATIVE

Road	Bare Land Value	Land Damage	Building Damage
South Side Elevated	$2,910,633	$795,047	$593,770
Metropolitan West Side Elevated	5,158,931	1,073,529	1,507,468
Chicago & Oak Park Elevated	347,692	27,383	23,000
Northwestern Elevated	2,487,611	409,880	900,486
Total	$10,904,867	$2,305,839	$3,024,724
Grand total			$16,235,430

minds had changed. At the time the purchases were made the owners of the real estate thought the elevated road would enhance the value of their property; since that time they had found that it did, but by a much smaller proportion than the increase in property values in the vicinity of the road but not actually touched by it.

Mr. Trainer's percentage of damage to property was based on the usableness of the remaining portion. He found that in many cases he had not given the remaining property a large enough damaged value, because he was unable to determine its size at the time the right-of-way was purchased. He showed his detailed methods of computation to the committee, and in all cases where property was not cut in two but whole lots were taken no damage was estimated.

In estimating the damage to buildings standing on the right-of-way when it was purchased Mr. Trainer found another problem. In many cases the maps of the railway showed that buildings had been on the property; in other cases no buildings were shown, but an examination of the ground showed that they had been there, thus making it a question of opinion as to the original value. The estimated value was based on the type of buildings found on adjoining property at the present time.

In a few cases Mr. Trainer included the damage to buildings which, although they were not on the property when purchased, furnished every indication that they would be there if the road were to be constructed at the present time.

HALF FARES FOR PUPILS OF INDUSTRIAL SCHOOLS UPHELD IN MASSACHUSETTS

The Supreme Court of Massachusetts has handed down a decision written by Chief Justice Rugg in the case of the Commonwealth vs. the Boston & Northern Street Railway Company, to the effect that Chapter 567, Acts of 1910, is constitutional, the point at issue being the refusal of the defendant to transport pupils of industrial and evening schools at a fare of 2½ cents each when traveling between home and school. The statute provides that not exceeding one-half the regular rate of fare shall be charged for "transportation of pupils of the public day schools or public evening schools or industrial day or evening schools . . . or private schools in traveling for attendance between home and school." The court finds that the statute does not impair, in contravention of Section 10, Article 1, of the Constitution of the United States, the obligation of the contract set forth in the charter of the Lynn & Boston Railroad Company, to which the defendant succeeded. The court holds that the charter right to fix fares is subject to amendment so long as the object of the grant is not defeated or essentially impaired and property and rights acquired upon the faith of the charter are not taken away. No charter contract can prevent the Legislature from the exercise of the police power. The court says:

"The legislative rate must be so small as to occasion a loss to the carrier if it performs the service required for the price permitted before it can be held unconstitutional, provided the total net earnings are such as to yield a reasonable return upon the value of the corporation as a whole, having regard to the fact that this is a burden imposed by a police regulation in the interest of education. It may be that a particular rate for a given carriage taken by itself would yield little or no profit, but taken in conjunction with the entire transportation it would not be unreasonable. The circumstances that the defendant has earned and paid reasonable dividends (5 per cent per annum since 1905 as stated by the defendant in its behalf), while of weight, is by no means decisive. . . .

"The case does not involve a general scheme of rates, but only that for a particular service. The inquiry is confined to the point whether a performance of a special duty at a rate fixed is so inherently unjust and unreasonable as to amount to the deprivation of property without due process of law. It is not enough to show that no profit may come from the particular service; it must appear that in conjunction with all the service of the corporation the rate is unreasonable. . . . The facts upon which the defendant relies are that by dividing the total number of passengers carried for a definite period of nine months or a year into the operating expenses and fixed charges for the same period it appears that the average cost of carrying a passenger is about 4½ cents, and that, as its reasonable regular fare is 5 cents, the result follows that to carry pupils at half fare results in a loss of 2 cents for each pupil. . . . It would not follow that compliance with the statute would cause the defendant a loss. It might be that the number of pupils who ride at reduced fare as compared with those who would not become pas-

sengers at the full fare, coupled with the preponderance of small children and the greater carrying capacity of each car for such passengers and the well-known fact that the hours of attendance at the schools are not the rush hours of travel, does not cause an actual loss. . . . It is not plain that the rate is confiscatory."

NEW TRANSFER TICKET IN NEW YORK

On June 1 the New York Railways Company will adopt a three-coupon transfer similar in general form to the ticket which for some months has been used on the surface car lines in the Bronx. The object of the change from the form of transfer at present used on the New York Railways lines is to provide the passenger who pays a 5-cent fare with a transfer ticket which will enable him to complete his journey without the necessity of obtaining another transfer.

The use of the ticket can well be illustrated by taking the case of a passenger who boards a 116th Street crosstown car. Upon paying his cash fare to the conductor and requesting a transfer this passenger receives a three-coupon ticket. On the right-hand coupon appear the names of all of the longitudinal lines to which he may transfer. The passenger is at liberty to select any one of these lines and the conductor of the longitudinal car, when he presents the transfer, will detach and retain the right-hand coupon. On the left-hand coupon are printed the names of all of the crosstown lines of the New York Railways system, with the exception of the one which issues the ticket, to which there is, of course, no necessity that he should transfer back again. Upon tendering the ticket to the conductor of any of these other crosstown lines the conductor on that line will detach and retain the left-hand coupon. If it so happens that the nature of the passenger's journey is such as to require that he shall transfer a third time in order to reach his point of destination, the central coupon or main portion of the ticket is valid at the points indicated thereon. Thus provision is made so that upon the payment of a cash fare a person may ride upon the cars of four different lines and may receive the benefit of the entire transfer privilege to which he is entitled. Neither the left-hand nor the right-hand coupon is good if detached from the central portion of the ticket, which bears the time limit section. In punching the ticket conductors will allow passengers sufficient time to make the desired trip.

Not Good If Detached
To Chambers or Duane St line
To Canal St line E or W
To Spring St line E or W
To Houston or Prince St line
To Bleecker St line E or W
To 8th St line E or W
To 14th St line E or W
To 17th or 18th St line
To 23d St line E or W
To 34th St line E or W
To 66th St line E or W
To 145th St line E or W
To 6th Ave Ferry line at 4th St and 6th Ave
23
SAT JUNE 1 1912
116th STREET CROSSTOWN LINE
NEW YORK RAILWAYS COMPANY
SAT JUNE 1 1912
T. F. SHONTS, President
To Ave C line S at 23d
To 9th Ave line S
To 7th Ave line S
A. M.
5 6 7 8 9 10 11 12
Not Good If Detached
To Lexington Ave line
To 4th and Madison Avenue
To Lenox Ave cars N
To 8th Ave
To Broadway-Columbus Avenue S at 106th St
To 9th and 10th Avenues line
To Broadway-Amsterdam Ave line
23
SAT JUNE 1 1912

New Transfer Ticket—New York Railways

The general form of the transfer tickets issued by the longitudinal lines is similar to the crosstown ticket shown, and, following the present color scheme, conductors of northbound avenue line cars will issue green tickets and conductors of southbound avenue line cars will issue red tickets. Most of the crosstown tickets will be white, as at present, but on certain of the crosstown lines downtown the conductors will issue a buff-colored ticket westbound and a lilac-colored ticket eastbound. The object is to prevent persons from making a round trip on the payment of a single fare under the conditions which exist on these lines.

As shown, the ticket indicates the day of issue and whether it is for a. m. or p. m. use. The company has made a departure in the issue of a. m. and p. m. coupons by having the a. m. division of the day between 5 a. m. and 3 p. m. and the p. m. division between 4 p. m. and 4 a. m. instead of dividing the day at noon and at midnight, as is usually done. This is because in the past it has been found that some people would prolong the time limit of their transfer by riding in a car for a short distance in the noon lunch hour with an a. m. transfer in order to get in return for it a p. m. transfer. Such action, it is thought, will be more inconvenient to many people at 3 o'clock than at noon. The figure "1" in the center of the middle coupon also helps the conductor to distinguish the a. m. from the p. m. ticket, the latter being printed with a "2" in the same position. The number "23" on each coupon in the ticket shown indicates the issuing line, in this case the 116th Street crosstown line. The end coupons are distinguishable between a. m. and p. m. by having a black square printed after the distinguishing number on the p. m. coupon. The star on the right-hand coupon is to indicate to the conductor that that coupon is to be detached first. In a few cases, owing to local conditions, the left-hand coupon has to be detached first.

The following notice to passengers is printed on the back of each ticket:

"No transfer is issued except on payment of cash fare.

"This transfer is good to any line named upon the coupons at intersection of issuing line or from a line named upon one coupon to a line named on the other at point of intersection.

"Upon transfer from issuing line to a line named on either coupon at intersection of issuing line conductor will detach coupon upon which his line is named.

"The second coupon will be good to any line named thereon at intersection of line used upon first coupon and conductor will detach and accept same for fare.

"The remaining coupon is good to a line named thereon as designated and conductor will accept the same for fare."

In a notice posted in the cars the company requests its patrons to read carefully the statement appearing on the back of the new transfer tickets, and the co operation of the public is requested in carrying out of the new plan, which is briefly explained.

The municipal tramways of Durban, Natal, South Africa, consist of 32 miles of track which represent an investment of $2,150,166. The gross income in the fiscal year 1911 was $553,360, and net profit $80,730, or 3.75 per cent. The fare is 3 cents for each tram stage with tickets, or 4 cents cash. An extension of 1½ miles is now being completed in the residential district.

Discussion on Electrolysis Prevention in Chicago

Hearing by Committee of City Council on May 23—Electrolysis Report of the Electrical Engineers Representing the Chicago Surface and Elevated Railways and Other Public Utilities

The Chicago elevated and surface railway companies are making vigorous protests against the proposed electrolysis ordinance, the substance of which was noted in the Electric Railway Journal for May 11, on page 795. The ordinance was discussed before the City Council committee on gas, light and oil May 23. A report reviewing the provisions of the electrolysis ordinance prior to Feb. 1, 1909, the ordinance of Feb. 1, 1909, and the proposed ordinance as amended May 16, 1912, was presented by a committee of engineers of the public utility companies interested.

The principal features of the first ordinance were stated in the report to be as follows:

(1) Allows use of grounded return circuit.

(2) Limits potential difference between return circuits and other underground metallic structures to 1 volt.

(3) Requires a potential gradient not to exceed ½ volt per 300 ft.

A brief outline of the requirements of the present ordinance as summarized in the report is as follows:

"(1) Allows use of a grounded return circuit.

"(2) Provides that the difference of potential between any point on the return circuit and the grounded dynamo terminal shall not exceed 25 volts.

"(3) Provides that all underground metallic structures whenever found positive to rails or earth must be so drained of current as to permit flow of current to earth. This last provision authorizes a drainage system, does not say who shall install it, and does not make co-operation mandatory on the part of the public utility companies."

The report continues:

"Five years previous to the passage of this ordinance, drainage systems from the pipes of the People's Gas Light & Coke Company had been installed leading into the California Avenue and Edgewater power houses of the Chicago Consolidated Traction Company, the Hobbie Street power house of the Chicago Union Traction Company, the Fortieth Street power house of the South Side Elevated Railway, the Twentieth Street substation of the Chicago City Railway Company and the Burnside power house of the Calumet Electric Street Railway. The Chicago Telephone Company has drainage systems protecting its cables at practically all of the power houses and substations in the city, and the Commonwealth Edison Company, Cosmopolitan Electric Company, Postal Telegraph Company, the Sanitary District and Department of Electricity, city of Chicago, each have one or more drainage systems protecting their underground cables.

"Although this ordinance has been in effect for more than three years, no effort has been made by the city water department to avail itself of the protective provisions of this ordinance in the way of connections from its pipes."

The proposed amended ordinance contains the following principal features, also as summarized in the report:

"(1) Allows use of grounded return.

"(2) Maximum drop between any two points on the return system shall not exceed 12 volts.

"(3) Requires a potential gradient not to exceed 1 volt per 1000 ft.

"(4) Requires the addition of a drainage system to protect underground structures.

"(5) Limits the amount of current on pipes and cable sheaths.

"(6) Provides for circuits and recording instruments to determine whether the requirements as to maximum drop are fulfilled.

"(7) Provides for equipment at each power station to record and limit the maximum current drained from metallic substructures to less than 10 per cent of the total current output of the station.

"(8) Allows to the companies a period of six months to comply with conditions of the ordinance.

"(9) Repeals the present ordinance, viz., that of Feb. 1, 1909."

Organization and Work of the Electrolysis Sub-Committee

To determine the actual conditions existing in Chicago with reference to electrolysis an "electrolysis sub-committee" was formed to carry on the investigations. The members of this sub-committee were chosen from the engineering departments of the following railroad and public utility companies: Chicago City Railway, Chicago & Oak Park Elevated Railroad, Chicago Railways, Chicago Telephone Company, Commonwealth Edison Company, Metropolitan West Side Elevated Railway, Northwestern Elevated Railroad, People's Gas Light & Coke Company, South Side Elevated Railroad, Board of Supervising Engineers.

This committee was instructed to make a complete study of the question. The activities of the committee were outlined in a letter written by the chairman of the Board of Supervising Engineers to the Commissioner of Public Works on July 27, 1911, and reported in the Electric Railway Journal of Aug. 5, 1911, of which an abstract follows:

The method of the committee is to treat the subject purely from a scientific and practical standpoint, discussing all matters freely and frankly—the object being to ascertain and recommend a practical method for the prevention of electrolytic action on the various underground metallic structures within the city of Chicago likely to be affected by return currents of any grounded system.

The committee has investigated and reported upon the conductivity of cement, concrete and earth materials. It has made measurements of resistances between return circuits and cables, conduits, water and gas pipes; has reported extensively upon methods employed to protect the lead sheaths of the cables, has studied the relation of the voltage to the electrolytic corrosion of iron, has made an extensive study and prepared a bibliography of the work previously done, has made extensive electrolytic surveys and improved local conditions at many places, has carried on two years of experimental work of electrolytic observations of sample track of the Board of Supervising Engineers' standard construction.

Based upon the investigations of this committee, the surface and elevated railway companies have made plans for numerous additional drainage systems. A drainage system has recently been installed in the vicinity of the Grand Avenue substation of the Chicago Railways and has given as complete protection as is possible without the co-operation of the city water department.

Objections to Proposed Ordinance

To analyze the engineering features of the proposed ordinance on electrolysis a committee of engineers representing the surface and elevated railways was appointed by the various companies. It consists of G. T. Seely and E. J. Blair, representing all the elevated companies; Victor E. Thelin, representing the Chicago City Railway, and H. M. Wheeler, representing the Chicago Railways.

This committee compiled the report abstracted herewith and submitted its conclusions as follows:

"We believe the proposed ordinance to be unreasonable and unnecessary for the following reasons:

"(1) The limitations of maximum drop in the return circuit are at least four times as severe as under the present ordinance.

"(2) The cost to comply with the proposed ordinance would be prohibitive.

"(3) Reducing the drop to the limits prescribed would not eliminate electrolysis, but drainage systems would still be required.

"(4) Drainage systems are required by the present ordinance and are used to greater or less extent by all owners of metallic underground structures, except the city water department.

"(5) Where these drainage systems are installed they secure practical immunity from electrolysis.

"(6) Should drainage systems be installed to cover the entire city with connections to all underground metallic structures, adequate protection will be secured at a cost that is reasonable.

"POTENTIAL LIMITATIONS ON UNINSULATED RETURN CIRCUITS

"The proposed ordinance allows a maximum drop of 12 volts between any two points on the return compared to the present ordinance allowance of 25 volts between the grounded dynamo terminal and any point on the return. This new drop is not only twice as severe a requirement as the old, but by specifying any two points on the return may mean that the total drop from one limit of the city to the other, say, 25 miles, can be only 12 volts. Thus, although the feeding districts of individual stations might be operating under the 12-volt limit, the drop over several districts would undoubtedly exceed 12 volts. The actual required reduction in drop is much more severe than is indicated by these figures, because of the requirement that the potential gradient shall be limited to 1 volt per 1000 ft.

"In designing a system to meet this requirement due allowance must be made for growth of traffic during construction period and for the fact that the maximum swing in return drop, due to fluctuating loads, will exceed the hourly average return voltage. This makes it necessary to use a gradient of 2/3 volt per 1000 ft. in redesigning the present system. This means that for every line of six cars on the track a special set of negative feeders will have to be run to the power house. These same feeders, if operated at maximum gradient, can carry only 96.4 amp per 1,000,000 circ. mils—which means that all rails and bare cables will have to be used at 10 per cent or less of their real capacity.

"In connection with the limitation to a maximum 12-volt drop, the fact that the maximum momentary swing will be from 25 to 100 per cent greater than the average for one hour should be taken into consideration. In designing power distribution systems and in computing generator and substation capacity for railway work, and in purchasing power, the average load for one hour is taken as the unit, rather than the momentary maximum. For this reason the drop in the return circuit should be specified as the average for any one hour, otherwise the 12-volt maximum allows only about 8 volts on the hourly basis. An 8-volt drop for one hour corresponds to a twenty-four-hour average drop of 3.2 volts, because the average load for twenty-four hours equals 40 per cent of the hourly maximum. It must also be borne in mind, if the drop is limited on the basis of an average for one hour, that the maximum hourly condition obtains for only three hours per day and for four winter months. To meet these conditions for about 300 hours per year the railway companies would be compelled to carry a very heavy burden of expense throughout the year. Further, during the period when the greatest drop would occur the dangers from electrolysis are a minimum on account of the frozen, and hence better insulating, condition of the ground.

"METHODS AND COSTS OF MEETING POTENTIAL LIMITATIONS

"Assuming that the ordinance requirements of track drop are in force, this can be secured by the following methods, and at a cost approximately as indicated:

"(1) An increase in the amount of bare copper in the return circuit. Owing to the fact that bare copper can only be loaded to 96.4 amp per 1,000,000 circ. mils, the cost of conforming to the proposed ordinance by this method would be approximately $22,600,000.

"(2) An increase in the number of power stations, together with additional copper. To reduce the return drop by this method will require an increase in the number of stations approximately proportional to the decrease in the drop. With the larger number of stations and consequent smaller capacity of each, the effect of swings will be greater and the station load factor will be decreased; also, a larger per cent of the total substation capacity will be required to be held in reserve. This will increase the total substation investment required for a given load. The smaller capacity of individual substations will entail a greater cost of operation, which will be a permanent addition to the operating cost. To conform to the ordinance by this method will require an investment of $9,868,680, and in addition, an annual increased charge for operation, maintenance, depreciation, taxes and insurance of $1,026,792. This would make the total annual increased expense for both surface and elevated lines, including interest on the investment required, $1,520,226. The reduction of the maximum drop to 12 volts by increasing the number of substations will not appreciably reduce the aggregate amount of current carried by the pipes and will increase the number of positive areas, making it necessary to install drainage systems equivalent to those required under the present ordinance.

"(3) Use of insulated return feeders. The use of insulated return feeders will require at least the duplication of the present positive feeder system, which will produce a potential difference of 50 volts between the power station and its farthest feeding point, which is four times the drop allowed under the proposed ordinance. To reduce this drop to the ordinance requirements would necessitate an expenditure of $30,300,000. There would be a positive area at the end of each insulated negative feeder which would require a drainage system centering at such point.

"DRAINAGE SYSTEM REQUIRED

"The fact that a reduction of drop to the above small values will not eliminate electrolysis is emphasized by the further requirement of the ordinance, that a drainage system must be installed. It is believed that the installation of a drainage system, without first reducing the track drop as required in the ordinance, will be effective in eliminating electrolysis. It has been estimated that a complete drainage system leading into all the power houses and substations in operation at the present time will cost $350,000. The cost of the necessary drainage systems required after the reduction of drop as contemplated in the proposed ordinance will not be lessened by the reduction in drop.

"Regarding the limit of 10 per cent of the total station current output to be returned over the pipes and cable sheaths and collected by the drainage system, observations on existing systems show that with the present maximum drop of 25 volts the amount of current drained from the underground metallic structures is less than 10 per cent of the station output.

"AUXILIARY EQUIPMENT REQUIRED

"The requirement of insulated pilot wire circuits and voltmeters giving chart records, etc., from four extreme limits on the return circuit of each station appears to be an unnecessary expense. Where a drainage system has been properly installed the amount of current shown on the ammeter of such a system gives a fair criterion as to the condition of the system.

"Arrangements could be made on short notice to furnish temporary pressure wires to determine the drop be-

tween any points in the return system. This would do away with a large investment and would give essentially the same information.

"TIME ALLOWED FOR COMPLETION

"The time allowance for compliance with the provisions of the proposed ordinance is fixed at six months. A complete drainage system covering all the power stations and substations in the city could be installed in from six to eight months of actual construction work. This drainage system is necessary, whether the lower limit of maximum drop is required or not. Should the proposed ordinance be passed, such a complete rearrangement of the entire distribution system and generating equipment must be made that it would take a careful study of from three to six months before actual construction could be started and a construction period of from twelve to eighteen months in addition. The drainage systems that must follow would require several months' time, as the proper design for a drainage system at any power station cannot be determined until the entire rearrangement of current distribution has been effected. This would mean a period of from two to two and one-half years for completion, while but six months is allowed in the proposed ordinance.

"COMPARISON BETWEEN ENGLISH AND CHICAGO CONDITIONS

"British Board of Trade regulations prescribe for all English cities a maximum drop of 7 volts.

"Data from twelve English cities having a total population of over 6,000,000 show that the average current density on the English return system is very much less than in Chicago. The average current consumption per car mile of the surface lines of Chicago is 4.21 kw-hr.; the corresponding figures for the English roads are 1.32 kw-hr. —or Chicago cars take 3.2 times as much current per car mile as the English cars.

"The average annual energy supplied per mile of track in English cities is 120,500 kw-hr.; for Chicago surface lines the figure is 500,000 kw-hr. These figures show that the average current density in the roads in Chicago is over four times as great as that in the English cities, but as the average English rail section is about 105 lb. per yard compared to 129 lb. per yard in Chicago, the above figure (4) should be reduced accordingly and become 3.25; or, in other words, with equivalent track construction in both places, the amount of current flowing in Chicago is 3.25 times as great as in England. The drop in the track is proportional to the current flowing, so that a maximum allowable drop of 7 volts in England is equivalent to seven times 3.25, or 22.75 volts, in Chicago. For this reason it is practically no more difficult to conform to the 7-volt limit in England than it is to conform to the present 25-volt limit in Chicago.

"It is evident from the terms of the ordinance that it has been based chiefly upon English practice and that by raising the English limit of maximum drop from 7 volts to 12 volts the intention has apparently been to make sufficient allowance for the heavier load condition in Chicago. When it is considered that the requirement of a gradient of 1 volt per 1000 ft. is equivalent to a limiting drop of 4 volts, it is apparent that the Chicago requirements are more than four times as severe as the English regulations.

"PROBABLE DEVELOPMENTS IN POWER DISTRIBUTION

"It must be borne in mind that the railway companies are even now making plans to increase the number of their substations to take care of certain districts which have heavy drops. It should also be remembered that in the event of consolidation of elevated and surface properties much reduction of drop will be effected by the joint use of the present power stations and the consequent redistricting of feeding areas.

"From the foregoing it is felt that within a short time improved conditions can be worked out. All of the companies have extended their lines and built up territories which are just beginning to afford enough return to justify the installation of additional power facilities. The proposed ordinance would always be a great barrier against extensions of railway lines into sparsely populated districts on account of the severe conditions imposed and the excessive investment required.

"In such districts, where heavy sub-surface structures are few and far between, the same limitations are placed on the railway return feeders as in the congested districts. If the proposed ordinance is passed, the railway companies have no assurance that within a short time an even more severe ordinance will not be drawn and enacted."

DISCUSSION ON REPORT

In the discussion of the report before the committee on gas, light and oil, Mr. Seely said a well-equipped drainage system could be installed in Chicago for $350,000. It would afford as much protection as the system of controlling the return current prescribed by the ordinance, which would entail a total annual expense, including interest on the investment required, of $1,520,226.

W. W. Gurley, general counsel for the Chicago Railways, asked permission of the committee to try the drainage system. He said it could do no harm and it was unjust and unfair for the city to ask the traction companies to expend millions when the expenditure of thousands would do the work as well. If the drainage system should be found not to give the proper protection after a thorough trial, then another method could be used.

Leonard A. Busby, president Chicago City Railway, suggested that the city and railway companies' engineers begin an elaborate investigation to determine what should be done to improve the present conditions and in the meantime permit the companies to install a drainage system.

City Electrician Ray Palmer replied to the arguments made by the report and the companies' representatives that the ordinance requirements were necessary to limit the return current to 12 volts, and said that the drainage system was only a makeshift and would be unnecessary if the provisions of the ordinance were followed. He also stated that the estimated cost as presented by the railway companies was too high. At this point the committee adjourned until May 27, when the discussion was to be continued.

MEETING ON MAY 27

The committee held another meeting on the morning of May 27 and Mr. Palmer resumed his argument. He attacked several points made in the report of the companies' engineers. He regretted, he said, that a complete metallic underground-contact conduit railway system had not been installed in Chicago similar to the New York and Washington underground systems. Possibly such a system might have been combined with a double-trolley system for the outlying districts. If installed at the time the rehabilitation of the Chicago street railway system was undertaken, the expense of such a system would not have been more than 10 or 15 per cent greater than the existing single overhead trolley construction. The speaker gave figures to show that the cost of the rehabilitated surface traction system in Chicago, which is very substantially built, was about $87,200 per mile of single track.

Mr. Palmer contended that the estimate of the companies that it would cost about $22,600,000 to install the return circuits demanded in the ordinance was absurd. The work can be done for $5,000,000 or less. This $5,000,000 would mean an increase of only 2.2 per cent added to the companies' own valuations of all their properities. The city electrician estimated that the annual cost of electrolytic damage to the city of Chicago and the public utility corporations of the city is $612,000. This is 5 per cent on $12,240,000, and therefore an investment of that amount would be justified for clearing up the situation. This estimate does not take into account losses due to the actual value of the gas and water lost through leakage.

Among other statements Mr. Palmer said that the double-

trolley system would eliminate electrolysis. Mr. Gurley said his information was that this system had not eliminated electrolysis in Cincinnati. Mr. Seely also took part in the discussion. The subject of negative boosters in return circuits was brought up, and Mr. Palmer said that these boosters were useful. Mr. Seely answered that they were not used at all in this country. Mr. Palmer replied that that made no difference.

E. J. Blair, an engineer for the elevated railroads, took part in the interchange and had a colloquy with Mr. Palmer in relation to the drop in the positive as well as the negative feeders. Mr. Blair said that on the elevated roads this drop did not exceed 125 volts and he asked if the city would be satisfied if a similar drop were permitted in the negative feeders. Mr. Palmer said that such a practice would not be good engineering, but he didn't care what the voltage was if both the positive and negative feeders were properly insulated. The question of the voltage of the railway circuits was one that related primarily to the railway service, but if both sides of the circuit were protected by some suitable insulation the question of voltage had nothing to do with electrolysis.

Mr. Palmer objected strenuously to relying exclusively on the so-called "drainage" or pipe-bonding system of electrolysis prevention. He challenged the companies' engineers to show where such a drainage system had been efficient for a period of three years or more. He cited the case of one city and said that it had made a great mistake in trying to clear up its electrolysis situation by the use of a drainage system. He made a strong plea for the installation of insulated return feeders of ample capacity.

Mr. Seely remarked that it was not fair to compare the conditions in the city mentioned with those in Chicago after the street railway rehabilitation there.

In explaining his proposed ordinance Mr. Palmer said that in his opinion a drainage system was not necessary; however, if installed to meet local conditions at certain points the work must be done under the stipulations of the ordinance. This explanation, he said, accounted for the fact that while he was opposed to the drainage system the ordinance as proposed apparently countenanced it.

H. B. Fleming, of the Chicago City Railway Company, told the committee about the elaborate investigation of the subject of electrolysis which has been made by a subcommittee of engineers representing the various public utility companies and working under the direction of the Board of Supervising Engineers, Chicago Traction. He read a letter from the board saying that in its judgment the immediate enforcement of the Palmer ordinance would be unnecessary and unjust. The board contends that with the extensions of the areas of rehabilitation and the building of more substations the present ordinance, which allows a maximum drop of 25 volts in the return circuits, will be complied with except in a very few instances. Further, the board believes that the maximum drop permitted should not be immediately reduced throughout the whole city, although a reduction might be made in congested downtown areas. The board also recommends that the surface railway companies be permitted to use the pipe-bonding system of protection.

The discussion as a whole was animated and interesting. No definite conclusion was reached, the committee requesting the city electrician, on the one hand, and the companies' engineers, on the other, to get together and endeavor to reconcile the wide variation in their estimated figures of cost to comply with the new ordinance—that is, $5,000,000 in one case and $22,600,000 in the other.

The committee then adjourned until May 29.

MEETING ON MAY 29

Continuing the lively discussion which has been going on in Chicago in relation to the pending ordinance to prevent electrolytic damage, another meeting was held on May 29. Ray Palmer, the city electrician, occupied most of the time of the long session to set forth his rebuttal of the companies' engineers' estimates of the expense of making the necessary changes called for by the proposed ordinance. The fact was brought out that there was not a very wide discrepancy between the companies' engineers' estimates and the city electrician's estimates of the cost in carrying out the provisions of the ordinance, so far as the elevated railways are concerned. The figures varied from $1,600,000 to $2,000,000. In relation to the surface railways, however, there was a much wider variation, the estimates here being, in round figures, $5,000,000 by the city electrician and $10,000,000 by the companies' engineers. The subject is complicated, however, by the various methods of meeting the situation which seem to be permissible under the proposed ordinance, so that without further and more detailed analysis the figures do not mean very much.

One fact brought out was that whereas there are fifteen substations now in use in Chicago for the surface railway systems, the companies' engineers estimate that thirty-eight would be required to comply with the proposed ordinance.

The city electrician favors, among other things, the use of negative boosters in return circuits. He was asked if negative boosters are used in this country and he answered in the negative. Explaining this fact, Mr. Palmer said that the absence of negative boosters arose from the fact that water-pipe extension departments in American cities have not employed electrical engineers to advise them in this matter. Further, there is no standard legalized maximum drop required throughout the United States as is the case in England. It is owing to these facts, according to Mr. Palmer, that negative boosters are not used in this country. The speaker added that Great Britain and European countries are far ahead of the United States in precautions taken to prevent electrolysis by current escaping from street railway returns.

W. W. Gurley, counsel for the Chicago Railways Company, asked if there was any city in the United States where the law required as low a maximum drop as 12 volts. Mr. Palmer said there was not but that that was no reason why the situation in Chicago should not be remedied. An animated colloquy ensued as to what might be considered prohibitive cost in adopting the remedy advocated by the city electrician.

Leon Hornstein, of the corporation counsel's office, came to Mr. Palmer's assistance and, as the lawyer who had drawn up the proposed ordinance, gave his interpretation of it. This ordinance does not compel the use of a drainage system in addition to the return-current drop provision. The speaker and Mr. Gurley had a lively interchange over the construction of the ordinance. Mr. Palmer assisted the city's lawyer in the difficult task of endeavoring to make clear the various technical and legal variations of a complicated subject. Mr. Hornstein quoted from one of the many findings in the celebrated Peoria electrolysis case, and that was the signal for the lawyers on the side of the companies to give their interpretations of what the judge meant to say in the recent pronouncements on this celebrated case.

H. L. Lucas, the representative of the city engineer's office in charge of water-pipe extension, said that the cases of electrolysis damage to water mains in Chicago are becoming more frequent.

Leonard A. Busby, president of the Chicago City Railway Company, quoted from the so-called "final decree" in the Peoria electrolysis case to show that the court in that long-drawn-out litigation had sanctioned the trying out of a drainage system. "Why not do the same here?" inquired Mr. Busby. If the ordinance is passed it simply means litigation, and the speaker suggested that the investigation be continued by the joint efforts of the city and the companies and in the meantime the companies be permitted to try out the drainage system.

A rather warm discussion on the merits of the so-called "drainage system," which is another name for the pipe-bonding system, ensued. In answer to a question Mr. Palmer said that he had formerly approved of the drainage system but that he did not now. H. B. Fleming, Chicago City Railway Company, read a report presented last year from which the speaker drew the conclusion that at that time the present city electrician sanctioned the drainage system. Mr. Palmer said his position was misconstrued. He added that a maximum 7-volt drop would be better than the maximum 12-drop volt proposed in the ordinance, the latter being supplemented by a drainage system. He proposed the 12-volt drop and worded the ordinance in such a way that the drainage system could be used also to give the companies a little more leeway.

Costs of operation and methods of figuring cost entered into the discussion. G. T. Seely, of the elevated railroads, pointed out the increased cost of operation by the use of the negative booster system.

R. H. Rice, engineer for the Board of Supervising Engineers, took part in the discussion. The board, he said, was standing neither with the city nor the companies; every bit of information that it possesses is available for both sides. The estimates of the cost presented on both sides are based on fundamental figures of the Board of Supervising Engineers. These fundamental figures have been used and applied differently by the two sides to the controversy. Certain allowances have been made by the railway companies which Mr. Palmer said should not have been made. However, Mr. Rice expressed his personal belief that in the main the figures of the railway companies are correct. He doubted if the companies could take measures to comply with the proposed ordinance at an expense as low as $5,000,000.

A. C. King also took part in the discussion on the methods of figuring the initial cost of the negative booster system. There was also considerable talk in relation to the method of ascertaining the loading of substations, and H. M. Wheeler, of the Chicago Railways Company, as well as Messrs. Rice and Palmer, took part in the discussion of this phase of the subject. When the committee adjourned no definite conclusion had been reached.

INTERLINE STEAM AND ELECTRIC SERVICE BETWEEN CHICAGO AND GARY

One June 2 the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., C. N. Wilcoxon, general manager, will start through train service between Gary, Ind., and Randolph Street, Chicago, in conjunction with the Illinois Central Railroad. Seven trains will be operated daily in each direction over this run of 31 miles, of which 14 miles will be on the high-speed through-line tracks of the Illinois Central Railroad and 17 miles on the recently double-tracked portion of the "South Shore" route which is operated with 3300-volt trolley distribution. The running time will be 35 minutes on each section of the route with 5 minutes' time at Kensington Junction allowed for cutting off the steam locomotive and attaching an electric motor car to the passenger coaches, which will be operated through.

The Randolph Street station is the northern terminus of the extensive suburban service operated by the Illinois Central Railroad—a service which includes more than 300 trains daily over a six and eight track entrance along the lake front of Chicago. The new service will mean the addition of fourteen more trains to the service already operated, but these trains will make only three intermediate stops on the Illinois Central section of the route between Kensington and Randolph Street and three intermediate stops on the electric portion of the route between Kensington and Gary. The trains will consist of two or three passenger coaches drawn by a steam locomotive on the Illinois Central section and by a high-speed passenger motor car on the electric portion of the route. One-half of the equipment for this joint service will be furnished by each road, and it is reported that the electric road will possibly buy six new trailer cars for this service. W. O. Woodward is traffic manager.

OKLAHOMA ELECTRIC CONVENTION

The first annual convention of the Gas, Electric & Street Railway Association of Oklahoma was held in Oklahoma City on May 22. The address of welcome to the city was delivered by Hon. J. W. Johnston. In his presidential address N. R. Gascho remarked that regulation by commission is practically a new feature in Oklahoma. In place of its being a hindrance to the electrical industries, many are already realizing that it has advantages.

In a paper entitled "The Central Station Manager as a Public Servant" F. E. Bowman, Ada, laid emphasis on the fact that a satisfied customer is a station's best advertisement. In the discussion which followed J. H. Freeman, Hobart, claimed that the corporation commission has already proved of great assistance in hearing complaints and showing how groundless most of them are. Lincoln Beerbower, Enid, remarked that according to his experience the cure for antagonism is to be found in publicity.

Prof. R. E. Chandler, Stillwater, presented a paper on "Crude Oil as a Fuel in Place of Coal." It was shown that with coal at $4 per ton and oil at 83 cents per barrel, the cost of evaporating a pound of water with coal is 0.03 cent and with oil is 0.02 cent. In addition to saving in fuel cost there would be a saving in labor cost. Results of tests were given showing that a Diesel oil engine, operating on crude oil, produced power at one-sixth of the cost of a good non-condensing steam engine using the same oil for fuel.

An interesting paper entitled "Necessities for Standardization of Equipment" was read by C. W. Day, master mechanic Oklahoma Railway Company, and discussed by H. V. Bozell, F. J. Meyer, W. F. Barnes, D. R. Perlweler and N. R. Gascho.

"Why the Municipal Plant Is Not as a Rule, and How It Could Be Made, a Success" was the title of a paper by V. H. Francis, Kingfisher. He attributed the lack of success to the fact that the direct responsibility for failure does not lie with any one man and no one man is affected materially financially or otherwise if the plant is not a success; hence a lax and indifferent spirit exists.

Other papers were read on "Gas Engines," by Paul M. Galloway; "The Operation and Efficiency of Tungsten Lamps," by C. E. Lahman; "The Relation of the Central Station to the Customer Through the Meter," by E. J. Mackay, and "The Economical Operation of Small Central Stations," by H. H. Stephens.

The following officers were elected for the ensuing year: F. W. Caldwell, Shawnee, president; F. E. Bowman, Ada, vice-president; Prof. H. V. Bozell, Norman, secretary-treasurer; J. A. Freeman and C. S. Dawley, directors.

Among the entertainment features were a smoker at Belle Isle and a banquet at the Lee Huckins Hotel. The attendance at the convention reached ninety, which was considered excellent in view of the fact that the association covers a territory in which there are fewer than 125 gas, electric and street railway companies.

The average voltage used on long-distance electric transmission in North America is about 750 volts per mile of transmission distance, at which rate the range of transmission with the present commercial maximum of 150,000 volts is 200 miles. This distance, however, has been exceeded in several instances, and in case the demand for energy should warrant it the transmission of electricity for distances up to 500 miles appears to be perfectly feasible.

Return Trip of Executive Committee

Visits Were Made During the Last Week of the Trip of the Committee at Louisville, Indianapolis, Cincinnati, Pittsburgh and Cleveland

This week was the last of the trip of the executive committee of the American Electric Railway Association, which has been making a tour of the country on the private car "Advance." Thursday, May 23, was spent in St. Louis, as described in the last issue of the paper On Thursday evening the party left St. Louis for Louisville and subsequently visited Indianapolis, Cincinnati, Pittsburgh and Cleveland.

If anything, this final week was more successful than any of its predecessors. The news of what had been done by this committee as it had gone from place to place had preceded its return and a good deal was expected from the members as they left the West on their homeward run. These expectations were not disappointed in any city.

VISIT AT LOUISVILLE

Louisville, Ky., was visited on May 25, the members arriving there about 11:40 a. m. Here they were the guests at luncheon of T. J. Minary, president Louisville Railway, and were entertained by him at the Pendennis Club, where they met about forty prominent business men of the city. In the afternoon they visited different points of interest in Louisville and in the evening were the guests of Gen. George H. Harries, vice-president of the association, at a large dinner at the Seelbach Hotel. The speakers included President McCarter, General Harries, Rev. Dr. E. L. Powell and Edward J. McDermott, Lieutenant-Governor of the State.

General Harries and Mr. McCarter, the principal speakers, made it clear that the solution of the questions confronting the backers of public utilities and the public depended upon the extent to which corporations took the public into their confidence and to which this confidence was appreciated. The 5-cent street car fare was discussed, President McCarter pointing out that there would be a limit to the distance to which a man could be carried for a nickel.

Mr. McDermott said that twenty-five years ago almost unlimited privileges were accorded to the big public utilities, but that things had gone to the other extreme during the last five or ten years. The public, he said, had developed a strong sentiment against the backers of these institutions. "The time has come for sober consideration," he said. He declared everything would have to be conducted along fair lines on the part of both public and corporations.

Among those present at this dinner were Hon. Edward J. McDermott, Lieutenant-Governor State of Kentucky; Judge Walter Evans, judge United States Circuit and District Court; S. Casseday, president National Bank of Commerce; George L. Danforth, president Louisville Board of Trade; T. J. Minary, president, T. H. Minary, assistant to general manager Louisville Railway Company; C. H. Hagerty, assistant general passenger agent Pennsylvania Railroad; John D. Wakefield, chairman Board of Public Works; J. W. Barr, Jr., John Stites, directors Louisville Traction Company; R. W. Knott, editor *Evening Post;* J. S. Duncan-Clark, managing editor *Louisville Herald;* J. J. Humphreys, general manager Louisville Gas Company; R. E. Hughes, president Kentucky Electric Company; Fred V. Gantt, resident manager General Electric Company, and Udolpho Snead, president The Snead & Company Iron Works, Jersey City, N. J.

At Louisville, O. T. Crosby had to leave the party owing to business which called him back to Washington. President McCarter tendered him the hearty thanks of the association for the faithful and effective service which he had rendered during a month of constant travel.

VISIT AT INDIANAPOLIS

The party reached Indianapolis at 10 a. m. May 24 and were met at the car by Messrs. Todd, Brady, Henry, Peck and Jeffries, of the Indiana companies. They were shown the boulevard system of Indianapolis on an automobile ride and were taken to the Indianapolis motor speedway, and then to the new power house of the local company. This was described recently in the Electric Railway Journal. At noon the visiting association officers and their hosts boarded the private car "600" of the Terre Haute, Indianapolis & Eastern Traction Company and were guests of Mr. Todd for a 45-mile run on the Terre Haute division of the interurban system. An old-fashioned country dinner was had at a farmhouse near Greencastle, about halfway between Indianapolis and Terre Haute.

A banquet was held in the evening at the Claypool Hotel and was attended by about 150 representatives of Indiana municipalities and public service corporations. The speeches of the visiting officials were particularly well received, and at the close of the banquet a vote of thanks was tendered the committee of entertainment by the mayors of thirty or forty towns, who were guests.

Arthur W. Brady presided as toastmaster and first spoke of the growth of the association, outlining how it had developed and of what factors it consists. The purposes and functions of the allied and affiliated associations were then described. Among other points discussed by Mr. Brady was that of regulation. He said there was no question as to whether there should be regulation, but there was perhaps a question as to how the public service companies should be regulated. He dwelt upon the unexampled trip of nearly 12,000 miles made by the visitors to study important and serious questions, such as the franchise matters, rates of return, etc. Mr. Brady said that in Indiana transportation facilities had developed in a way unknown in other parts of the country which had the same density of population. He thought that the Indiana roads had a very proper understanding of the public's needs and said that public relations in Indiana were very cordial.

Mr. Brady then introduced Mr. McCarter, who summarized in a strong way the electric railway situation of to-day. Mr. McCarter first paid a very high testimonial to the late Hugh J. McGowan, of Indianapolis, and then he took up in a direct and forceful way the mission of the trip. He said the electric railways had nothing to conceal and that the sooner the roads and the public had each other's confidence the better it would be for the communities served. He gave examples to show that the business was not a bonanza, stating that only about half of the roads in Massachusetts paid any dividends on their common stock and that the average dividend for all roads was in the neighborhood of 5 per cent. Mr. McCarter explained why it was useless to expect development if the rate of return was to be limited to the customary rate of interest. He said that the flat-rate 5-cent fare had done more than any other factor to develop American cities. He urged the representatives of the municipalities to recognize conditions as they were to-day, not as they have been. The pendulum had swung so far that franchises were now limited in many states to twenty years, and it was simply impossible to finance an electric railway on that basis. The representatives of the public should let the investors feel that they would get a fair return commensurate with the hazards involved and that this return would continue for a reasonable length of time.

Mr. Brady read a letter of regret from ex-Vice-president

Charles W. Fairbanks, who felicitated the electric railway industry and expressed his regrets at not being able to make an address at the banquet.

Mr. Brady then introduced Hon. Charles A. Bookwalter, former Mayor of Indianapolis—the Mayor, Mr. Brady, said, who made it possible for the interurban roads to have a fair franchise for entering the city. Mr. Bookwalter said he had been cartooned and lampooned for giving the interurbans a fair show in entering the city, yet within a year afterward he had received letters from fifty retail merchants conclusively showing that their retail business had increased by 33 1/3 per cent. Mr. Bookwalter said that corporations were a necessity to the life of every community and that transportation features were the most important factors in the development of any city. He decried the type of politician who was always breaking into the newspapers with attacks upon the public service corporations. He said the roads were often attacked by real estate speculators who were determined to get extensions to outlying pieces of property which admittedly would not give the roads sufficient earnings to warrant the extensions. Mr. Bookwalter pointed out many reasons why the interests of the community demand that the corporations should receive fair treatment. With regard to the rate of return he stated that one sleet storm alone would take away the possibility of earning a 6 per cent return and that there were many other hazards to be counted which were worse than sleet storms. Indiana, he said, was particularly fortunate in its public service corporations and the good feeling existing with the public.

The Mayor of Indianapolis, Samuel L. Shank, spoke a few words in a pleasant vein as a testimonial to the welcome of the visiting officers and to his high regard for the local transportation officials.

General Harries was introduced as one of the strong men of the electric railway industry. He addressed the gathering on the dignity of the association and the high aims of its officials. General Harries said he had recently received word from the president of the American Railway Association, representing the steam railroads, that that organization would be glad to consider jointly with the American Electric Railway Association such subjects as improvement of transportation rules, standardization, etc. General Harries spoke of the need for better understanding between the public service corporations and the municipalities. He referred briefly to the rate question and then pointed out that the American Electric Railway Association was unique in that never at any time or at any session had any discussion taken place that could not be spread before the public. The work of the association was entirely elevating and educational.

President Brady then called attention to the importance of the American Electric Railway Manufacturers' Association and introduced Charles C. Peirce, whose speech was in amplification of the need by electric railways and municipalities for good service, good wages and good dividends.

VISIT AT CINCINNATI

The party reached Cincinnati on May 27, where it was taken in hand by W. Kesley Schoepf, president Ohio Traction Company, who acted as host and local guide, ably assisted by Dana Stevens, vice-president Cincinnati Traction Company, and other members of his staff. The Queen City Club provided an excellent meeting room for the luncheon, at which addresses were made by Messrs. McCarter, Harries, Peirce, Mayor Henry T. Hunt, and Charles P. Taft, first vice-president Ohio Traction Company. Among others who were present at this luncheon were: J. B. Foraker, Jr., second vice-president, W. A. Draper, secretary, W. H. MacAlister, comptroller Ohio Traction Company; Thomas Fitzgerald, Jr., assistant general manager Cincinnati Traction Company; Henry C. Ebert, president Cincinnati Car Company; B. J. Jones, general manager, F. A. Healy, secretary and treasurer Ohio Electric Railway Company; C. R. McKay, general manager Cincinnati, Newport & Covington Street Railway; W. C. Loree, general manager Cincinnati, Hamilton & Dayton Traction Company; Arthur W. Brady; James C. Ernst, president South Covington & Cincinnati Street Railway; R. B. Hackney, president Cincinnati, Georgetown & Portsmouth Railroad; Robert I. Todd, president Indianapolis Traction & Terminal Company; E. K. Stewart, vice-president, Samuel McMeen, president Columbus Railway & Light Company; F. R. Coates, president Toledo Railway & Light Company; E. D. Grimes, president City Railways, Dayton; Hon. J. A. McMahon, president People's Railway Company, Dayton, and representatives of the municipal and state governing boards and civic associations.

In the evening Mr. Schoepf gave a dinner to the party at the Country Club, where they were met by twenty-five distinguished citizens, including Senator Foraker.

VISIT AT PITTSBURGH

When Pittsburgh was reached on the morning of May 28 the party was met by Messrs. Callery, Reed and Tone, who are respectively president, first vice-president and second vice-president of the Pittsburgh Railways. The visitors were taken to the works of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, where inspection was made under the guidance of E. M. Herr, president of the company. After luncheon at the Duquesne Club, the visitors were taken to the City Hall, where they were introduced to the Mayor and City Council. One of the most effective meetings of the journey was held at the University Club at a dinner to which Mr. Callery had invited about 100 guests. Among the latter was George Westinghouse, who received a real ovation when he arose to make an address. Mr. McCarter delivered one of the most effective speeches he had made since leaving New York six weeks before. The president of the City Council, Mr. Herr and Mr. Peirce also delivered addresses.

VISIT AT CLEVELAND

The last stop was made at Cleveland, Ohio, on May 29. The travelers were weary and anxious to reach home but at the same time were greatly interested in that city because of the experience it has gone through in reaching its present place in street railway history. The party was met by the following committee: John J. Stanley, president Cleveland Railway Company, chairman; George T. Bishop, Washington, Baltimore & Annapolis; A. E. Akins, Cleveland, Southwestern & Columbus; E. W. Moore, Lake Shore Electric Railway, and Henry J. Davies, Cleveland Railway. Several other railway men accompanied the committee to welcome the visitors. The party at Cleveland consisted of Thomas N. McCarter, Arthur W. Brady, Gen. George H. Harries, Charles C. Peirce, Arthur Warren and H. C. Donecker. Messrs. Brady and Harries joined the party in Cleveland, after having been absent for a few days.

After a short visit on the private car "Advance" the gentlemen were taken on an automobile trip to various points of interest in connection with the local railroad and through the boulevards and parks on the East Side. At the Woodhill carhouse an exhibition of fire protection furnished by the monitor nozzle system was given. Near here also the visitors were favored with a ride in the new car for underground operation invented and built by A. B. du Pont.

Some time was spent in visiting the various departments of the car repair shops at Lake View and the carhouse at Windemere. At the latter place the utility of the sprinkler system was demonstrated by opening a few heads between car tracks. On invitation from D. B. Dean, of the Kuhlman Car Company, the party was next taken to that company's plant at Collinwood. Much interest was manifested in a car with a pointed front vestibule which will be operated on one of the roads at Utica, N. Y. A car of the "near-side" type was also shown. After leaving the plant,

the party was taken back to the city over Lake Shore Drive and through Gordon Park.

Luncheon for about sixty guests was served at the Union Club, where Henry J. Davies, secretary Cleveland Railway Company, acted as toastmaster. After speaking of the relation of the public to the street railways and discussing the situation in Cleveland to some extent, Mr. Davies introduced Mayor Newton D. Baker, who had stood very close to Mayor Johnson all through the long struggle which finally ended in the present contract between the city and company. Mayor Baker confined his remarks largely to a history of that struggle and the purposes which induced Mayor Johnson to begin it. The principal trouble in the final settlement when Mayor Johnson and F. H. Goff were conducting negotiations, he said, was in relation to franchises, as they were difficult to value in money. After reviewing the history of the Municipal Traction Company, he paid a high tribute to Mr. Goff for his unselfish work for the good of the people and to a number of others who had spent their time and energies in the struggle.

Mayor Baker said he did not want to be optimistic in regard to the rate of fare, but he believed that Cleveland had secured the best settlement of the question of any city in the United States. The officers of the company fully appreciated the trust that had been placed upon them, and he complimented them on the manner in which they were operating the property. He concluded by reiterating his belief in municipal ownership of both the railway and lighting properties.

President Thomas N. McCarter of the American Electric Railway Association was the next speaker. He said that the party had traveled about 15,000 miles on this trip and had left the toughest stop for the last. He had enjoyed the friendship of former Mayor Johnson for many years, and had visited him a few days before he came home from New York City to die; but, notwithstanding the high respect in which he had always held Mr. Johnson, he did not believe in the situation in Cleveland. It was not good for the men who had their money in the enterprise, and therefore it was not good for the people of the city. After speaking of the many benefits to a city afforded by electric railways, Mr. McCarter said they owed much to the public and he did not object to proper supervision of securities or even to supervision of the rates of fare, but unless something was done to bring about a realization of the proper relations between the people and the corporations, their purposes would fall short or fail because it would not be possible to secure money with which to develop them. If the struggles in Cleveland, Chicago, Toledo and Detroit were to be repeated in other places, capital for development and extensions would not be forthcoming. They would become dangerous enterprises. They would be subject to countless other ills besides those common to other lines of business.

In discussing the rate of fare, President McCarter said that the cities had grown to such an extent that the roads could not continue to operate on the unit system as they had in the past. The hauls were so long that the income would not pay the operating expenses and a fair profit in addition. The experience of the Hudson River tunnels was mentioned as an example of great benefits conferred without any dividend return as yet on the money invested. Electric railway business must be done along commercial lines, and the corporations must not serve as political footballs. The old idea of perpetual franchises had disappeared, but on the other hand there was a demand for short term rights from certain cities. Roads could not be financed on such franchises. An attempt should be made to reach a medium that will be fair to all.

Mr. McCarter said that he did not consider the Cleveland agreement a solution of the problem at all, but merely an unfortunate situation. The city of Cleveland was not guaranteeing stockholders 6 per cent on their money. The company was merely allowed to earn this 6 per cent, provided it maintained its fare between two given points, the maximum of which was too small for the operation of a railway in any city in the country. Regarding the limitations as to cost of operation, Mr. McCarter repeated that this was a commercial proposition. The cost could not be estimated in advance, as had been attempted in Cleveland, because of the fluctuation in prices and values. In conclusion, he pointed out the folly of limiting the growth of a railway system below the needs of the city which it served.

Homer H. Johnson, president Chamber of Commerce, opened his remarks by saying the public lived in an oligarchy, with street railway magnates before it and perpetual officeholders behind it. While he was particular to say that the Cleveland railway officials had always kept clear of such things, he did assert that the scandals in relation to franchises had put the people on the side of the city administration in the street railway struggles. He agreed with President McCarter when he said the pendulum had swung too far the other way and that the people and city governments must realize that there was a reasonable limit beyond which they should not go. He expressed his belief that some arrangement would be made whereby there would be a business man's profit in the business and not merely bond interest. The people did not want municipal ownership, he said, but merely insisted that everything should be done right out in the open.

Street Railway Commissioner Peter Witt began his remarks by stating that he disagreed with Mr. McCarter's remarks. Cleveland had blazed the way and the time would come when street railway men would be glad to follow its example. While all of them did not look at it that way, Mr. Witt said that the directors of the company were public trustees and as such were discharging high duties for the people. Before his term expired he expected to see President John J. Stanley working harder for the people than he had ever worked for the stockholders, although he had certainly done his duty by them. He asserted that the present arrangement was the best one ever entered into, although it was not just what the administration wanted.

Andrew Squire, of Squire, Sanders & Dempsey, counsel for the Cleveland Railways, spoke of the origin of street railways in Cleveland and said they had been largely financed by Cleveland people who had felt the need for them. The trouble in Cleveland originated over franchises. Those who opposed the company took advantage of the expirations and threatened strangulation. This attitude was mostly political, but a settlement was finally reached and now an experiment was being tried. Some months ago a few revisions were made in the franchise and now he believed that the capital was safe. The city was suffering from a lack of extensions and cars, and the people were not being cared for as they should be. Extensions to attract new enterprises could not be given by the city because it would endanger the low fare, and thus there was danger of checking its growth. The railway was in a position to progress just as rapidly as the city would allow.

Attorney F. H. Ginn, representing a number of the interurban railways, said that seven such lines entered the city and that they had an aggregate of 795 miles of track. The franchise question should be left to the State Public Service Commission. The local company, he said, had been strangled by the franchise that had been placed upon it.

Arthur W. Brady, president Indiana Union Traction Company, closed the program with a very interesting talk on the situation that was confronting many companies now. Civilization had progressed with the development of transportation and the modern means of communication. For this reason every effort should be made to create a better understanding between the public and the public utilities. Both were to be congratulated upon the fact that there was a tendency to treat fully together. In their relations there must be intelligence and understanding, if real progress was to be made.

The meeting was adjourned at 5:30 and the party left at 6 o'clock over the Lake Shore Railroad for New York City.

CONCLUSION OF THE TRIP

The trip of the committee came to an end at the New York terminal of the Pennsylvania Railroad on Thursday morning, May 30. The members who had made the entire voyage, which included 11,000 miles by train and 4,000 miles in electric cars and automobiles, were Messrs. McCarter, Donecker and Warren of the American Electric Railway Association, and C. C. Peirce, American Electric Railway Manufacturers' Association. The constant travel, visiting, speechmaking and banqueting made the trip a most arduous one, but according to the testimony of railway men, the good it seems to have accomplished everywhere in acquainting public officials in each place visited with the standpoint of the electric railway companies made the hardship and personal sacrifices well worth while. The members of the party feel that the trip has been completely successful, but believe that permanent results can follow only if the member companies and individual members continue the publicity work in their own locality. Not only the officers who participated in the work but all who heard and came in contact with President McCarter spoke highly of the personal service which he had rendered in giving so much of his time and energy for the benefit of the industry as a whole.

ADDRESS ON TERMINAL ELECTRIFICATION IN CHICAGO

Frederick A. Delano, president of the Wabash Railroad Company, addressed the City Club of Chicago on May 27 on "The Transportation Proposals of the Commercial Club of Chicago." The address was one of several delivered and to be delivered as discussions on the general subject of "Chicago's Transportation Problem." Mr. Delano explained first the elaborate Chicago plan of the Commercial Club. This plan, which has attracted much attention, contemplates planning for the future betterment of the city in various directions on a thoroughly scientific and carefully thought-out basis.

The question of transportation naturally figures conspicuously in such a plan, as Chicago is the terminal of twenty-three trunk-line railroads. The terminal facilities and the interchange of these railroads is therefore very complex, especially as the railroads, like Topsy, "just growed" and have not planned their terminals in concert as the result of any underlying system.

Mr. Delano touched upon electrification at the close of his speech. He referred to the "enormous expense" of equipping the railroad terminals of Chicago for electrical operation. Nevertheless electrical operation has one great advantage from the railroads' point of view; it makes possible the use of space over the railroad terminal tracks for buildings or for thoroughfares. This economy is being practised in New York in the rebuilding of the New York Central terminal. Measurably the same opportunity exists in Chicago.

By the possibilities of electrification the railroads may be able to carry out the plan to some extent in the Chicago situation. The railroads have made no progress in reducing their cost of transportation in large city terminals; therefore, a more intensive use of the valuable property taken up by railroad terminals is indicated. If the use of the ground can be increased by constructing buildings or new streets above the level of the tracks, and thus bringing in a revenue, something will have been accomplished in reducing the cost of terminal transportation.

The substitution of electricity as a means for handling heavy traffic in place of the steam locomotive gives promise of relief from existing conditions.

PROGRESS ON THE 3-CENT COIN BILL

According to reports from Washington, considerable objection has developed throughout the country against the proposed coinage of new 3-cent pieces and ½-cent pieces, as provided in the bill passed May 6 by the House of Representatives. As stated in the columns of this paper for May 11, the bill was introduced in the Senate on May 7 by Senator Pomerene of Ohio and referred to the Senate finance committee. The members of this committee are: Boies Penrose of Pennsylvania (chairman) and Senators Cullom of Illinois, McCumber of North Dakota, Gallinger of New Hampshire, Heyburn of Idaho, Bailey of Texas, Stone of Missouri, Kern of Indiana, Lodge of Massachusetts, Smoot of Utah, Clark of Wyoming, La Follette of Wisconsin, Simmons of North Carolina, Williams of Mississippi and Johnson of Maine.

This committee has literally been deluged with protests against the passage of the bill, and a member of the committee recently said that an average of fifty letters and telegrams a day had been received in opposition to it. Probably more objection has been expressed against the coinage of the ½-cent piece than against the 3-cent piece, although serious objections have been filed against both of the proposed coins. One of the most important arguments urged against the ½-cent piece is that it will compel all banks to add another column to their ledgers and to other stationery which they use to tabulate their accounts and that it will make obsolete their adding and other computing machines, which now, of course, do not provide for the registration of ½-cent pieces. It is upon these grounds that the Clearing House Association of Chicago has made a strong protest to the Senate finance committee against the bill. But this difficulty would not, of course, be confined to banks. It would affect every storekeeper and every other user of a cash register, who would have to get a new machine to take care of the new ½-cent pieces. In fact, practically all change making, coin counting and handling machines would be affected and would have to be rebuilt. It has been estimated, according to protests filed in Washington, that the losses to merchants, manufacturers, bankers, railways and business men from this source alone would amount on an aggregate to millions of dollars. As the ½-cent piece would be a legal tender, no one could refuse to accept it.

The manufacturers of fare boxes have also objected strongly against the inconvenience and loss in which the addition of two new coins would involve them, their objections being directed against both the 3-cent piece and the ½-cent piece. They say that when the present 1-cent, 5-cent and 10-cent coins are worn smooth the difference in color of the metal is an important aid in distinguishing them and that the addition of two more nickel coins would make it practically impossible to tell what is deposited on the inspection plate of a fare box, even if the coins are not to be counted mechanically. Where this is done, still another difficulty would be met. The registering fare boxes depend for their operation upon the difference in diameter of the coins registered, and the difference in size between the present nickel and the proposed 3-cent piece is so small as to make it difficult, if not impossible, for a registering box to distinguish between them. The manufacturers of these devices also say that it would be hard to devise a machine which would register quickly a 5-cent fare paid by ten ½-cent pieces if the proposed law went into effect. Of course, all existing automatic registering fare boxes would be obsolete, as would also a considerable part of the machinery now in use by the manufacturers. A number of street railway companies have protested on the ground that many patrons would pay a 5-cent fare in ½-cent pieces or in two 3-cent pieces, and this would occasion delay and would also compel conductors to carry a much larger amount of change than at present.

As previously stated in this paper, some of the daily newspaper publishers who now sell their papers for 1 cent fear that the introduction of the ½-cent piece would induce some publisher to reduce his price to ½ cent, and this would compel most or all of the other 1-cent daily papers in the same city to make the same reduction. For the same reason Sunday papers now sold for five cents would probably be reduced to three cents.

On the other hand, there seems to be no public demand for either of the new coins. Practically the only advocates have been the municipal authorities in Cleveland and Toledo, who think the 3-cent coin would be a convenience in those cities for the payment of 3-cent car fares.

Senator Penrose, chairman of the finance committee, is quoted as saying recently in regard to the bill: "We shall proceed deliberately and not recommend any such important change in the coinage of the nation without giving everybody an opportunity to be heard. No date has been fixed for taking it up, and with the tariff bills which must be attended to before us at present there is no telling when we shall reach it. In the meantime we should like to know who are interested, so that when it is reached they can be notified to appear and present their views. We have received communications on both sides, and many persons have communicated with me personally by telephone or otherwise."

PROGRESS OF THE STOTESBURY MANAGEMENT IN PHILADELPHIA

The relation of the new management of the Philadelphia Rapid Transit Company with its employees is summed up in five bulletins which have been issued by the board of directors during the past ten months. The first, published in August, 1911, outlined a plan by which a certain proportion of the receipts of the company was to be set aside for the payment of all labor charges, including the union dues of the men, and by which the men were to vote as to the union which they would join and to which these dues were to be paid by the company. This was published in abstract in the issue of this paper of Sept. 2, 1911. The result of this voting, which, because of the two-thirds majority required, was not decisive in favor of any one union, was described in the Electric Railway Journal for Feb. 3, 1912. After it was clear that the employees could not unite upon the selection of any one labor organization, the management organized a co-operative committee composed of representatives of the company and of the men, with T. E. Mitten, chairman of the board of directors of the company, as chairman, and has summarized the conclusions of this committee on the various matters submitted to it in Bulletins 1, 2, 3 and 4. An abstract of Bulletin 1 was published in the Electric Railway Journal for Feb. 24. Bulletin 2 was dated March 15, and Bulletin 3 April 30. In the latter the announcement was made that meetings of the co-operative committee would be conducted in the near future in accordance with the co-operative plan announced on Aug. 28, 1911. In accordance with this announcement, arrangements were made for the reduction of the co-operative committee from thirty-eight members, consisting of a motorman and conductor from each depot, to nineteen, or one man from each depot. A ballot was taken during the period from April 30 to May 14 in order that the men might choose representatives to act on the co-operative committee to meet with the management.

Following the meeting of the board of directors of the Philadelphia Rapid Transit Company on May 20, 1912, Employees' Bulletin No. 4 was issued by the Stotesbury management. This bulletin contains a number of important announcements in regard to the relations of the company with motormen and conductors in its employ and gives in tabulated form the results of the election which was closed on May 14, 1912, for the choice of representatives of the men on the co-operative committee to deal with the management. At this election 6250 men voted out of a total of 7013, and two committees of nineteen men each, or one man from each carhouse, have been selected. These committees represent respectively the first and second choices of each carhouse. The two committees will attend alternate meetings, thus bringing the management directly in touch with 79 per cent of the men.

The bulletin reviews the attitude of the Stotesbury management toward labor and says that on account of the disturbed condition brought about by the factional strife the management thought it best to postpone the selection of the co-operative committee and give the opposing factions an opportunity to settle their differences before being called upon to assist in the selection of such a committee. In the meantime the company selected a representative motorman and conductor from each of the nineteen depots, and these are the men who have been meeting since with Chairman Mitten. Many points of difference between the men and the former management have been removed. This work will now be continued by the committee selected at the election which closed May 14. Referring to the division of the men in their labor affiliations, the management says in the bulletin:

"The motormen and conductors seem to be at this time more than ever divided in their affiliations. Out of a total of 7013 motormen and conductors employed by the company approximately 4200 are wearing buttons signifying that they either hold membership in the Amalgamated Association or the Keystone or are followers of C. O. Pratt. The buttons of each of these three classes are about equally numerous, none seeming to have a sufficient number to represent 25 per cent of the whole, while those who wear no button whatever approximate 40 per cent of the total number employed by the company.

"There seems to be but little probability of any change in this line-up; the recent attempt made by John Mitchell and the Central Labor Union to adjust the differences between the Amalgamated Association and the followers of C. O. Pratt was currently reported by the Philadelphia daily papers of May 13 to have been given up as hopeless, and the committee appointed for that purpose by the Central Labor Union was dissolved.

"This management, being definitely obligated to improve the service to the public, must not be delayed by the unsettled condition of its men brought about by this factional disturbance, and it has therefore determined that the co-operative plan will be continued in force with the men as individuals, at least until the close of the fiscal year ending June 30, 1913.

"While this management will not attempt to dictate to any man as to his right to belong to a labor organization, there must be a discontinuance of bickering among the men and of any other practice in connection with the performance of their duties which interferes with the most effective team work and the greatest degree of co-operation.

"At the expiration of the year ending June 30, 1913, the company agrees that, upon the presentation of a petition requesting it so to do signed by not less than one-third of its motormen and conductors, it will again arrange for the taking of a vote in accordance with the terms set forth in the co-operative plan. Should the men, therefore, have by that time settled their differences and then decide by a two-thirds vote in favor of the company making a contract with the men as an organization instead of their being dealt with as individuals, a contract will be made with organized labor at that time under the terms as set forth in the co-operative plan."

The details are given of the operation of the 22 per cent wage fund for the ten months ended April 30, 1912. This fund, based on gross passenger earnings of $17,860,360, amounted to $3,929,279. The sum of $3,894,853 was paid

in wages, $17,230 in pensions and death benefits, and $6,025 in unearned wages under the strike settlement agreement of April 5, 1910, leaving a balance of $11,169 in the fund for the ten months. Wages for this period were $209,257 greater than in the corresponding ten months a year before. The company's promised increase in wages by which a maximum wage of 24 cents an hour was to be made effective on July 1, 1912, was by the use of this 22 per cent fund made effective Jan. 1, 1912, or six months ahead of the agreed time. It is now proposed to make effective on July 1, 1912, the increase to a maximum wage of 24½ cents per hour promised in the co-operative plan to be made effective on July 1, 1913. This advance will thus be made one year ahead of the company's original promise.

For the ten months ended April 30, 1911, $17,110 was paid in pensions and death benefits to motormen and conductors. This amount is included in the 22 per cent fund. For the ten months ended April 30, 1912, $17,230 was paid in pensions and death benefits to motormen and conductors. The amount paid on account of personal and death benefits for both of these periods includes only the payments made on account of motormen and conductors. Pensions and death benefits to other employees are not paid out of the 22 per cent fund.

The bulletin concludes with the following statement in regard to the plans of the Stotesbury management for improved service:

"The first year of the Stotesbury management has so far been almost entirely consumed in the work of preparation, there being little of actual accomplishment as yet, in so far as definite improvement in service to the public is concerned. The 'near-side' car, after exhaustive tests, has been adopted as the Philadelphia standard, and new cars of this type are being received at the rate of 100 per month, so that with the beginning of the year, July 1, 1912, at least 350 of these cars will be in actual service, with 500 additional coming on at the rate of 100 each month.

"There has been no possibility of any great improvement in service prior to this time, as the company has had no additional cars available for this purpose. The public has been most considerate and has accepted the promise of this management as to future improvement in good faith, and this management must now, by the use of these new cars, as delivered, make good its promise to the public, and to that end bespeaks the earnest co-operation of its employees."

ARKANSAS ASSOCIATION CONVENTION

The fifth annual convention of the Arkansas Association of Public Utility Operators met at the Marion Hotel, in Little Rock, May 20, 21 and 22. The regular program consisted of routine business and reports and the address of President J. M. Hewitt, of Mariana. His prediction of a record-breaking attendance was amply fulfilled the last two days of the session. On Monday afternoon W. H. Walkup, of Batesville, read an excellent paper on "Troubles and Their Remedies," with special reference to the operation of medium and small-sized plants. He mentioned a number of improvements in ways and means of boiler and engine operating so as to cut out as far as possible all waste. By using a tally counter to record each barrow of coal and a water meter on the boiler-feed line he keeps continual watch of boiler efficiency. In the discussion which followed the general opinion was that water supply service has many more troubles than electric service.

Prof. W. M. Gladson, of the University of Arkansas, then read a paper on the "Uses of Electricity." He mentioned briefly the early history of the science of electricity, and stated that the great industrial advance of the Southern States is largely due to their hydroelectric developments of the past fifteen or twenty years. He noted the extensive electrochemical industries, such as the refining and separation of copper, aluminum, gold, silver, etc., and also the production of ozone and nitric acid. He added that the electric furnace is especially useful where electricity is cheap and coal dear, and that the effect on city and country life of the telephone and trolley car has been very beneficial, helping to make tenement houses entirely unnecessary. The application of electricity to farming operations is opening new markets for energy, while the countless heating devices for domestic and commercial use have provided "day loads" undreamed of twenty years ago.

Papers on electric lighting subjects were read by B. C. Fowles, T. A. McDowell, E. C. Bellamy, H. J. Maugher, A. E. Smith, F. N. Jewett and M. Q. Woodward

The convention went into executive session and elected the following officers for the ensuing year: J. W. McClendon, Fayetteville, president; W. C. Maguire, Arkadelphia, first vice-president; J. F. Christy, Jonesboro, second vice-president; A. E. Main, Hot Springs, third vice-president; W. J. Thorpe, Little Rock, secretary-treasurer.

THE CITY CLUB'S EXHIBITION OF CHICAGO'S TRANSPORTATION FACILITIES

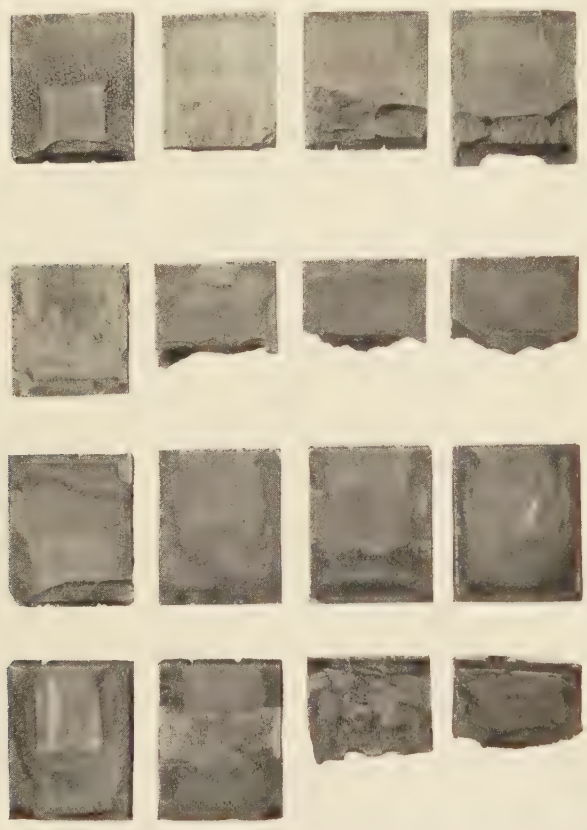
The City Club of Chicago has prepared a transportation exhibit at its club house in the Loop district, portraying the transportation facilities by boat, on foot, on wheels, through pipes and over wires in the city of Chicago. The exhibit was undertaken in an attempt to show how Chicago has outgrown its existing transportation facilities. The list of exhibits, which is the result of several months' work, includes a collection of maps especially prepared by Charles K. Mohler, consulting engineer, showing the growth of steam railroads in Chicago by five-year periods from 1850 down; a map showing the number of cases where one railroad is crossed by another railroad; plans showing the transportation proposals of the Commercial Club; a map prepared by H. H. Evans, secretary of the City Council committee on local transportation, showing in bold relief the density of population in different parts of the city and the location with reference thereto of transportation lines; a series of original studies by William Drummond for a comprehensive improved transportation system for Greater Chicago, to be gradually worked out; a diagram by Mr. Rex, assistant city statistician, showing the percentage of the city's area which is devoted to transportation in its various forms, as well as the percentages devoted to other uses; a diagram by the Board of Local Improvements showing the relative amounts of unpaved and paved streets, together with the kinds of pavement used, and a map prepared by the Greater Chicago Federation showing the surprising number of points where the main or section line streets of the city are closed.

The freight interchange problem, the harbor question, the water, gas, telephone, telegraph and electricity services are covered by particular exhibits, and there is a special exhibit of the post office service. Other exhibits deal with the question of street grades, the sub-surface pipe and wire network and the style of viaducts crossing streets. Studies are shown by Arthur A. Shurtleff, landscape architect of Boston, as to the relation between the width and traffic capacity of streets, and by the eminent Parisian Eugène Henard as to the best methods of dealing with cross traffic at street intersections and points where numerous streets converge. A collection of plans is also shown illustrating the careful methods employed by Berlin traction experts in analyzing the principles of city traffic in the great capitals of Europe.

As noted in the ELECTRIC RAILWAY JOURNAL of May 25, in addition to the exhibits a series of illustrated lectures dealing with every phase of Chicago's transportation problem has been prepared.

CARBON BRUSH TESTS OF THE THIRD AVENUE RAILWAY, NEW YORK

During the years 1908 and 1909 the Third Avenue Railway, New York, placed in service a total of 150 closed (series 700 to 850) and 300 convertible (series 851 upward) new prepayment cars. The motors of all of these cars were furnished with Le Carbone brushes. However, to keep in touch with carbon brush developments, the company determined to keep a continuous record of the performances of sample brushes of the manufacture mentioned and also of such other brushes as might be submitted to it for trial from time to time. The consequence of this policy to date has been that since May 14, 1908, forty-six brush equipments, including twenty distinct styles from eight makers, have been carefully watched for wear, for physical features such as grain, homogeneity, chipping, breakage, etc., and for cost per 1000 miles, without indicating any valid reason for a change from the present brush standards. The method of keeping comparative performance of the different brushes tried is presented in the accompanying table, which was prepared from data in the office records of J. S. McWhirter, superintendent of equipment Third Avenue Railway. The original tables also give the names of the manufacturers, the numbers of the cars, the original size and wear of every brush, the last average size of all brushes per set and "remarks." All test brushes were identified by a "V" which was cut into the top of the brush. Although the tests were not carried out under laboratory conditions, only four sets of brushes were removed by mistake. The width of most of the brushes was 2 16/64 in., but there were a few as narrow as 2 12/64 in. and one as wide as 2 17/64 in. The company's standard tension per brush-holder spring is 6 lb. for the GE-210 motors and 5 lb. for the Westinghouse 310 motors.



Types of Test Brushes. The Lower Eight Are All of One Type and Were Applied on One Car Simultaneously

Le Carbone brushes "G" and "E," designated as "A-1" and "A-2" in the table, were on three test equipments. The only trouble from these equipments was evidence of uneven wear shown by one set after 45,280 miles had been operated.

Manufacturer "B" had four styles of brushes on trial on ten cars. These brushes were easily chipped and broken. One set of B-1 brushes did operate 55,705 miles, but was removed because of commutator wear.

Manufacturer "C" had only two sets on trial but his brushes were satisfactory.

Manufacturer "D" had two types on fourteen cars. Most of these brushes were removed after runs of varying length for breakage, chipping and uneven wear.

Manufacturer "E" had three equipments of one type, which gave good service except that they blackened the commutators.

Manufacturer "F" had five types on six cars. All but two sets were removed after comparatively short runs on account of breakage, chipping, uneven wear and wear on the commutators.

Manufacturer "G" submitted one type of brush for two cars. The brushes broke after very short runs.

The very latest installation was made by manufacturer "H" (not given in the table), who furnished the same type of brush for five equipments. These brushes were applied March 10, 1912, to both types of motors. All of the brushes which were then applied to the three cars with Westinghouse 310 motors have been since removed. The brushes in the GE-210 motors will have to be removed soon, as they are cutting the commutators.

Abstract of Carbon Brush Record of Third Avenue Railway, New York

Brush	Motor	Installed	Last Inspection	Mileage	Average Wear in 64ths of an Inch	Wear in Inches, 1000 Miles
A-1	GE-210	5/20/08	4/20/10	30,686	..	....
A-2	GE-210	5/14/08	3/10/11	45,280	..	....
B-1	GE-210	5/20/08	9/17/11	55,705	16	.0045
B-2	GE-210	1/31/09	9/17/11	59,789	22	.0057
B-3	W-310	1/26/11	9/17/11	14,489	..	....
B-3	W-310	1/26/11	9/17/11	18,904	10	.0083
B-3	GE-210	1/26/11	3/10/12	25,684	12	.0073
B-3	GE-210	1/26/11	9/17/11	32,084	5	.0024
B-4	W-310	1/26/11	3/10/11	2,622	..	....
B-4	GE-210	1/26/11	9/17/11	18,305	6	.0051
B-4	GE-210	1/26/11	9/17/11	13,771	7	.0077
C-1	GE-210	7/30/09	3/10/12	45,077	18	.0062
C-2	W-310	7/28/09	9/17/11	38,413	14	.0057
D-1	GE-210	5/29/09	3/10/11	31,179	16	.0080
D-1	W-310	5/29/09	12/1/09	15,286	8	.0082
D-1	W-310	10/20/09	4/20/10	15,321	12	.0120
D-1	W-310	10/20/09	3/10/11	44,206	..	....
D-1	W-310	10/22/09	4/20/09	13,226	12	.0140
D-1	GE-210	5/29/09.	9/17/11	49,192	25	.0079
D-2	W-310	10/20/09	3/10/11	39,066	..	....
D-2	W-310	10/26 09	3/10/11	37,356	..	....
D-2	W-310	10/22 09	4/20/10	14,797	11	.0120
D-2	W-310	10/20/09	7/20/10	23,642	13	.0086
D-2	GE-210	5/29/09	3/10/11	45,927	16	.0054
D-2	W-310	10/24 09	3/10 11	53,715	..	....
D-2	GE-210	5/29. 09	9/17/11	58,420	20	.0053
E-1	GE-210	5/10/10	3/10 12	41,537	17	.0071
E-1	GE-210	5/10 10	9/17/11	29,340	9	.0048
E-1	GE-210	9/16 10	3 10/11	11,831	16	.0021
F-2	W-310	9/16/10	3 10/11	10,039	..	....
F-3	W-310	9/16/10	3/10 11	9,930	..	....
F-4	GE-210	1/16/12	3/10 12	6,400	5	.0122
F-5	W-310	1/16/12	3/10 12	6,200	3	.0075
G-1	W-310	9/19/11	11/24/11	....	..	..
G-1	W-310	9/19/11	3/9 12	..	..	..

CARBON BRUSH COSTS

The following table shows the carbon brush costs from August, 1911, when this item was first segregated, to March, 1912, inclusive, for all electric cars, except storage battery cars, operated by the Third Avenue Railway on its Third Avenue, Forty-second Street and Dry Dock divisions:

Mileage	Date		Cost
1,065,778	August,	1911	$27.82
1,019,762	September,	1911	....
970,229	October,	1911	49.34
955,499	November,	1911	23.11
964,307	December,	1911	8.66
913,982	January,	1912	14.83
930,199	February,	1912	38,89
1,031,208	March,	1912	18.75
7,850,964			$181.40

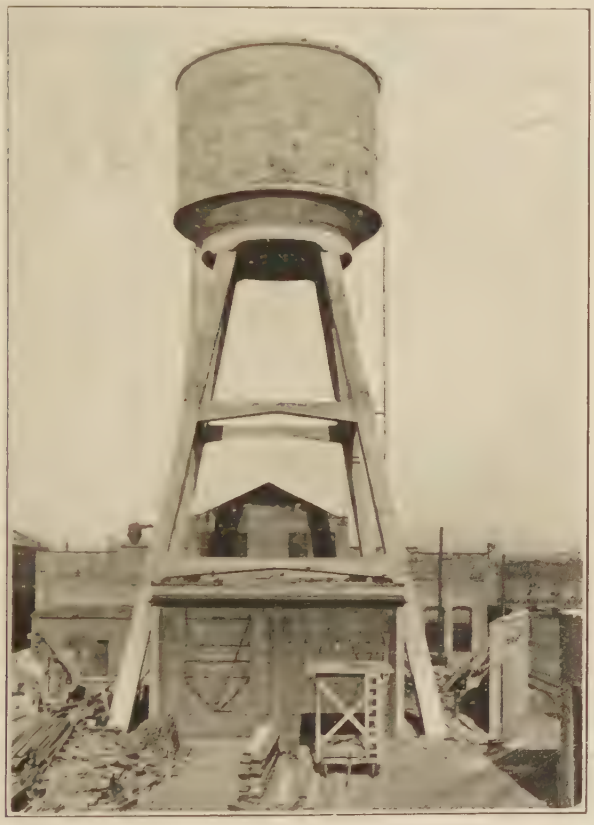
Cost: 2.31 cents per 1000 car miles.

During the same period, namely August, 1911, to March, 1912, inclusive, the storage battery cars ran 482,597 miles, including the mileage of the Twenty-eighth Street cross-town line for January, February and March, 1912, without requiring a single brush removal.

The total number of Le Carbone brushes furnished the Third Avenue Railway for its standard cars since Oct. 10, 1911, is 11,500. It may be of interest to add that of this great number of brushes not more than a dozen were broken in the middle. Some brushes were broken at the top owing to defective design in one type of brush holder. Recently this design has been somewhat improved. It should be added that this brush was the only one that could be used at all in this type of brush holder.

REINFORCED CONCRETE SPRINKLER SUPPLY TANK FOR CHICAGO CITY RAILWAY

The Chicago City Railway Company has recently completed an elevated reinforced concrete tank of 100,000-gal. capacity at its general repair shop at Seventy seventh Street and Vincennes Avenue, to serve as an auxiliary water supply to the existing 1000-gal. per minute motor-driven underwriter's pump which is supplied with water through a connection to the city mains. The new tank furnishes the supply whenever the pressure, normally 90 lb. per square inch, which is maintained by the 1000-gal. pump drops below 50 lb. per square inch, due to an insufficient supply of water from the city mains. The pump



Concrete Sprinkler Tank—Chicago City Railway

is designed to start automatically whenever a drop in pressure is caused by opening any of the shop service taps which are connected to the sprinkler service mains. Ordinarily the pump is automatically cut in every three hours. The new tank is of sufficient capacity to supply four 1¼-in. nozzles for four hours.

TANK DESIGN

After a careful consideration of the cost of maintaining a structural steel tank, which included the cost of cleaning and painting from time to time and the attendant danger of an accident to painters at work on the tank, it was found that about one-third the difference between the cost of steel and reinforced concrete would be saved annually if a reinforced concrete tank was employed. The tank, which is shown in the illustration, has a 30-ft. inside diameter and is 29 ft. 3 in. over all in height. The shell was made 8 in. thick, although the engineers now state that they would make it 6 in. thick if another tank of the same capacity were to be built. The side walls were reinforced with ⅝-in. square rods up to height of 10 ft. above the base and with ½-in. square rods from the 10-ft. point to the top of the tank. The rod spacing was varied from 5 in. to 8 in. on centers vertically, and ⅝-in. vertical rods at about 3-ft. spacing were employed to take care of any vertical stresses in the tank walls.

Two domes form the top and bottom of the tank. This type of construction was used to eliminate supporting beams and to furnish drainage. The water collected on the roof of the tank is permitted to drain into it, through six drain openings provided in a gutter formed at the periphery of the roof. The tank is supported on four 30-in. square reinforced concrete columns which incline from a spread of 42 ft. 10 in. on centers at the foundation level to 14 ft. 10 in. at the base of the ring girder which transmits the tank load to the supporting structure.

On account of the appearance and the fact that the structure was built over an existing building, diagonal braces were omitted, and each bent was figured as a nine times indeterminate structure. Two sets of horizontal reinforced concrete ties were constructed between the four legs of the tower at a height of 23 ft. 4 in. and 46 ft. 8 in. above the top of the foundations. The ties were designed to take care of any tendency in the columns to buckle, owing to the load of the tank when filled with water and to the wind stresses.

PIPING SYSTEM

Six-inch inlet and outlet cast-iron pipes were embedded in two of the tower legs. It was believed that the surrounding concrete would furnish sufficient insulation to prevent freezing, but the designers took the extra precaution to install a 2-in. steam pipe parallel to the inlet pipe and to permit the steam pipe to rise 3 ft. into the tank and return down the other column beside the outlet pipe. If steam is passed through this 2-in. pipe during very cold weather, it is thought that the formation of ice will be prevented.

A check valve, protected by gate valves on each side, which are usually kept open, is placed on the connection to the high-pressure mains. An altitude gage indicates the elevation of the water in the tank, and a 4-in. tell-tale overflow pipe embedded in one of the tower legs discharges on the ground near the outlet pipe manhole, when the water is within 3 ft. of the top of the tank or at the 100,000-gal. level.

L. J. Mensch, of Chicago, designed and constructed the tank for the Chicago City Railway Company. The designs were checked by Hugo Schmidt, superintendent of buildings of the railway company, under whose direction the tank was constructed.

ALLEN & PECK, INC., ASSUME MANAGEMENT OF BALTIMORE & ANNAPOLIS SHORT LINE

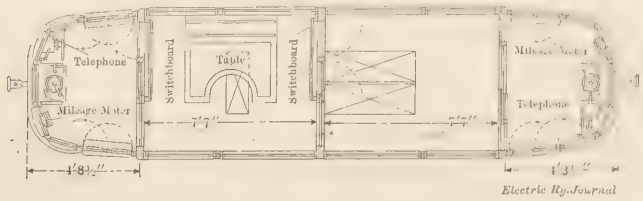
Allen & Peck, Inc., have assumed the management of the Baltimore & Annapolis Short Line. Parties in Baltimore have been heavily interested in this property for a number of years. Prior to 1908 it had been operated as a steam road, but at that time it was equipped with the alternating current 6600-volt system. At present the road is operated over private right-of-way between the Camden station of the Baltimore & Ohio Railroad in the city of Baltimore and a station in the city of Annapolis.

Talmadge C. Cherry, who has been engaged in electric railway work since 1896 in New York, Pennsylvania, Ohio and Michigan, and three years past has been with the Utica & Mohawk Valley Railway, has been elected vice-president and general manager, and will be the representative of the firm of Allen & Peck, Inc., upon this property.

GERMAN TEST AND INSTRUCTION CARS

The Siemens & Halske Company, Berlin, has developed a test car somewhat similar to the Herrick test car in this country. It will be employed for the instruction of car men and such diverse purposes as determination of motor control and braking efficiency and of energy consumption over given sections of track under various sets of conditions. The car uses a spark-type recorder which indicates all current impulses during acceleration and braking without possessing the troublesome inertia of inking recorders.

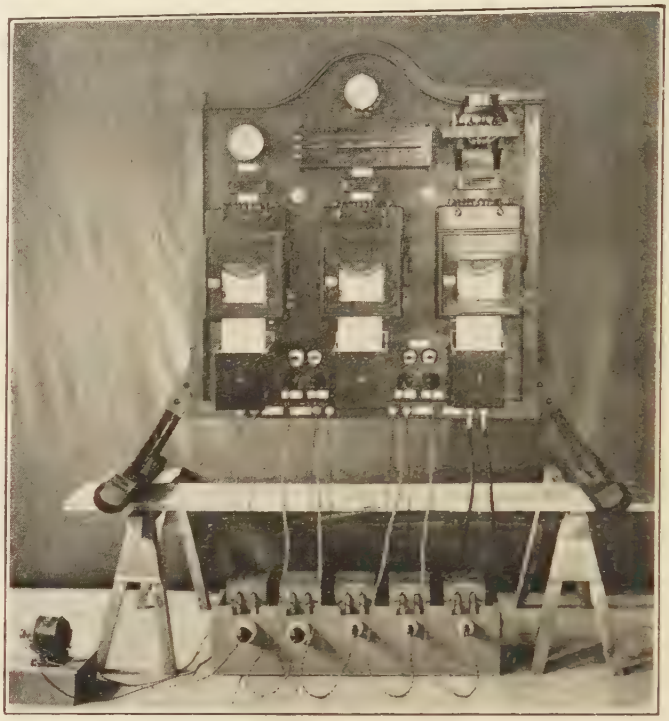
Several of the accompanying views illustrate such a car and parts of its equipment as furnished to the Cologne municipal tramways. The plan view shows that the interior is divided into two large compartments, one of which



Plan of Test Car

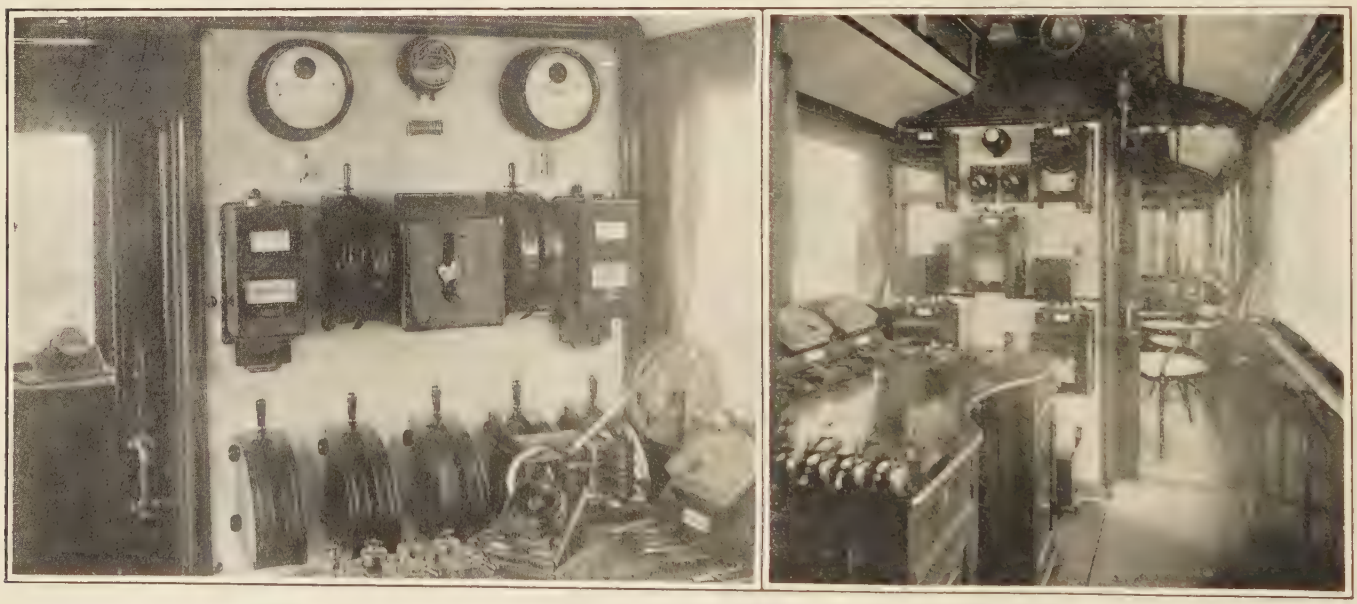
contains the apparatus and the other the office furniture for the testing staff. The apparatus is carried on two switchboards and on a table between them. The complete outfit includes the following: (1) One ammeter for the total current consumption; (2) one voltmeter for the line voltage; (3) one watt-hour meter for total energy consumption; (4) one ammeter per motor; (5) one ammeter per magnetic brake circuit; (6) one voltmeter for brush voltage per motor; (7) one ammeter for the exciter current of auxiliary generator; (8) one ohmmeter. Items 1, 2 and 7 are switchboard instruments and items 4, 5, 6 and 8 are instruments of the precision type which are mounted on the table in parallel with the corresponding paper-strip recorders. There are recorders for the following purposes: Total current consumption, current consumption per motor during acceleration and braking, line voltage or variations in the armature and coil voltage of given motors when used in connection with a voltmeter reversing switch, and speed of car as indicated by connections to a generator on the car axle. The paper strips are fed at the rate of 4¾ in. per minute. Push buttons in the tables are provided to control electrical devices whereby the time during which certain records are made can be indicated at will. Energy for these timing devices and the inductors of the spark-type records is furnished by a battery.

A quadruple or four-pen recorder forms an important part of the equipment. This recorder is combined with a modified Morse instrument which receives current impulses from



Simplified Testing Outfit for Portable Use

contact disks mounted on the car axles. The pens, which are of silver, are operated under spring pressure and are controlled by electromagnets. The record strip is of sensitized paper, which permits visible writing. The first pen records the speed as given by means of the disk on a trailing axle. In like manner, the second pen records the action of the wheels on a driving axle, such as slip during acceleration and braking. The third pen, which is used with a clock, measures the time of various actions in seconds. The fourth pen is used with a printing stamp to record the beginning of particular operations such as starting and stopping.



Views of German Test Car, Showing the Several Types of Scale-Reading and Graphic Instruments

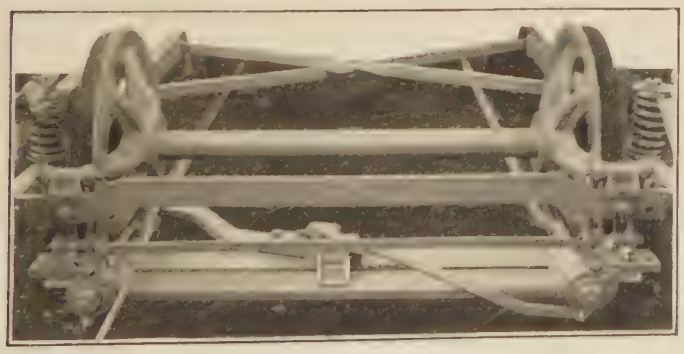
The floor of the test car is fitted with trap doors or glass covers to permit observation of the motors and compressor when they are in operation. Loud-speaking telephones are also provided for conveying control instructions to the motorman.

The Siemens & Halske Company has also devised a less elaborate portable combination. As shown in one of the views, the strip recording instruments are placed on a board which has two legs and one arm, as illustrated, to brace it against the car seats and roof respectively. This equipment consists of current and voltage recorders and of a speed recorder which is used with an axle generator. All of the recorders have the same type of electric timing arrangements and strip receptacles as the costlier equipment. The sparking is regulated by means of the resistances shown on the board. This board also carries resistances for regulating the exciting current of the axle generator and an ammeter for indicating this current. Three battery cells are furnished to operate the spark inductor and timers, and two cells are used to supply the exciter current for the axle generator.

The manufacturer states that, although the speed recorder may be omitted, the joint use of the voltage and current instruments is indispensable for trustworthy testing. In addition to the devices mentioned, test cars may also be furnished with instruments for finding the resistances of rail joints and for testing armatures.

AN IMPROVED AUTOMATIC BRAKE ADJUSTER

For the purpose of automatically maintaining at all times a uniform brake-lever travel for both hand and air brakes without necessity for use of an excessive number of working parts, the automatic brake adjuster shown in the accompanying halftone has been developed. The device consists of a ratchet casting which has a threaded hole in the center and is screwed onto the brake rod in place of the usual adjusting nut or turnbuckle. This ratchet is inclosed by a compact casing which rotates on the ratchet casting and carries a pawl. The casing and pawl are rotated each time the brake is applied by means of a link extending between short arms on the casing and on the brake lever. The normal movement imparted to the pawl by the brake lever is less than the distance between two teeth of the ratchet so that ordinarily the pawl moves back and forth on the surface of one tooth without any effect. However, as the brakeshoes wear and the motion of the brake lever, and consequently the motion of the pawl, is increased, a point is reached where the travel of the pawl is greater than the distance between each pair of teeth. When this occurs the pawl engages with the next tooth and rotates the ratchet casting on the brake-adjusting screw, reducing the travel slightly. The reduced travel prevents the pawl from engaging with another tooth of the ratchet at the next application of the brakes so that the brake travel is not again reduced until additional wear of the shoes has taken place.

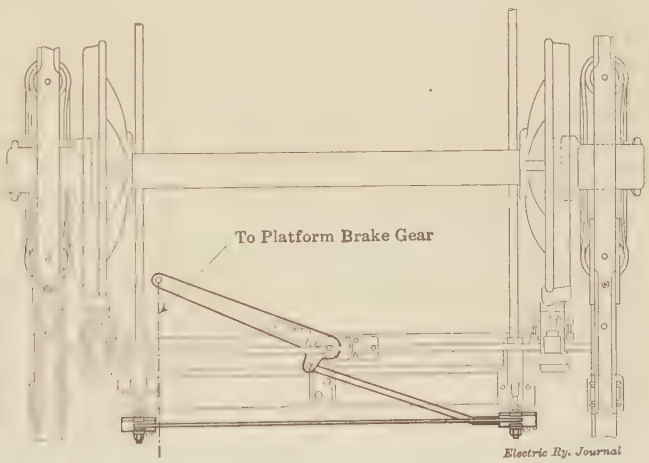


Anger Automatic Slack Adjuster

The accompanying plan shows the adjuster applied to a single-truck car with hand brakes. The adjusting nuts at the ends of the brake rods have been removed and replaced by the ratchet and pawl of the automatic adjuster. The brake lever, as shown, is provided with a short projecting arm, and to this is attached the link which moves the pawl. These are the only changes in the brake rigging required for installing the device. On inside-hung brakes the principle is the same, the only difference being that the pawl and ratchet is used to replace the usual turnbuckle in the bottom truck connection or push-rod instead of the adjusting nut ordinarily used with the type of brake rigging illustrated.

Pawl and Ratchet

The construction of the pawl and ratchet is shown in the small line cut. The circle in the center indicates the threaded end of the brake rod upon which the ratchet casting is screwed when it replaces the adjusting nut. The casing which carries the pawl and to which the operating rods are attached at the top and bottom revolves freely on the ratchet casting. Whenever the brake is applied the lower operating rod or link which is attached to the short arm on the brake lever, as shown in the plan view, rotates the bottom of the casing to the right, and the pawl slides vertically on the tooth with which it is shown in contact. The spring at the right side of the casing holds the pawl at all times against the surface of the teeth. When the brakes are released the lower operating rod moves the lower part of the casing to the left, or back to its original position. In case the pawl has engaged with a new tooth, the ratchet casting rotates with the casing during this return movement and, in consequence, it is screwed up on the brake rod. The upper rod acts simply as a tie between the two casings on the two brake rods so that both operate together. The ratchet casting is extended to form a square nut at one end so that when the pawl is lifted away from the teeth by the handle shown extending to the left the ratchet casting can be screwed back on the brake rod with a wrench. The object of this is to permit slacking off the brakes for the application of new shoes or for making other repairs. When the pawl is lifted away from the teeth of the ratchet the device is inoperative and the arrangement becomes exactly similar to the standard manually-operated brake rigging.



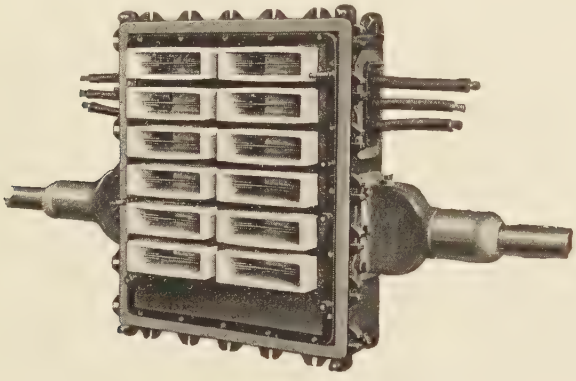
Plan View Showing Operating Parts

The device is the invention of J. E. Anger, of Preston, England, and it is being placed upon the market by George H. Anger of the same place.

A CABLE JUNCTION BOX FOR HIGH-TENSION CIRCUITS

The high-tension cable junction box shown in the accompanying cut has been brought out by the Standard Underground Cable Company, Pittsburgh, Pa. This is believed to be the first high-voltage junction box made in this country. The flexible leads which project through the sides are arranged to terminate within the large removable nipple. This nipple has a rounded or dome-shaped end made entirely of soft metal such as lead or lead-tin alloy. This dome is united with that portion of the nipple which is of brass or other rigid material by a strong water-tight joint. The leads are connected to the outermost contact points of each row of disconnecting switches, the innermost point being connected to the busbars.

The exposed live parts are isolated in cells of porcelain so that the disconnecting blades can be inserted or removed by means of insulated tongs with safety. The porcelain cells are permanently fastened in a metal framework, which in turn is fastened to the box in such a manner that a chamber is formed between the framework of cells and the bottom and sides of the box. This chamber, after the carrying



High-Tension Cable Junction Box

parts that enter it are put in place and insulated with tape (when desired), and after the moisture has been removed by the heat and vacuum process, is filled with a hot insulating compound. Insulating stuffing boxes prevent the compound from oozing out along the flexible leads when the box again warms up under working load. The concealed current-carrying parts of the box are therefore assembled and insulated before the box is sent out from the factory.

All that is necessary to make the cable connections is to unbolt the nipple from the box, cut off with a saw or jackknife the dome-shaped end of the soft metal portion of the nipple, and, after threading it over the cable, joint the conductors to the insulated flexible lead. After this the nipple can be replaced, the joint wiped and the space within the nipple filled with hot "Ozite" insulating compound. The connection is then complete.

As the contact blades when removed leave the flexible leads dead, it will be readily seen that one or more of the cables may be connected after the box is in service and while it is alive. This box is adapted for interconnecting two or more one, two, three or four-conductor cables and may be used for a.c. or d.c. circuits. It has been used in large quantities on circuits of 4500 volts working pressure for nearly two years with satisfactory results. In other installations it is operating at 5000 volts. The same general design is suitable for still higher voltage.

An interesting reference to the box and its use by the Pacific Gas & Electric Company is given in the April proceedings of the American Institute of Electrical Engineers in a paper by Messrs. Lisberger and Wilson. These boxes originally were designed to meet the needs of Mr. Lisberger, who is chief engineer of the company named and who cooperated with the manufacturer in perfecting this design.

ELECTROLYTIC ARRESTER FOR RAILWAY SERVICE

An electrolytic type of arrester for railway work has recently been placed on the market by the Westinghouse Electric & Manufacturing Company in two styles, for 600-volt and 1500-volt circuits. This type has two essential characteristics, due to a film of hydroxide of aluminum which is deposited on aluminum plates or trays, that enable it to fulfil the conditions required. These essential characteristics are that it automatically offers a very high resistance to currents at normal voltages and a very low resistance to currents above a certain critical voltage and that it possesses the properties of a condenser, offering high effective resistance to currents at low frequency and low effective resistance to currents at the high frequencies that are prevalent in lightning discharges. The decrease in resistance occurs very rapidly at a certain critical voltage, so that for currents at double the normal voltage the film offers practically no resistance to the flow of current, but when the excessive voltage ceases the resistance is in-

New Type of Electrolytic Arrester for Railway Service

stantly restored and no power current follows the discharge nor is there any arcing.

The new arrester, as illustrated, consists of a tank of oil in which is placed a nest of cup-shaped aluminum trays on properly insulated supports. The spaces between the trays are filled with electrolyte. The top tray is connected with the line through a 60-amp fuse, and the bottom tray is connected to the tank, which is thoroughly grounded by means of a lug. A fuse of the inclosed type is mounted on the cover of the arrester. A small charging current flows through the trays continuously and keeps the films on the trays built up, so that no charging is required. This charging current is not, however, of sufficient value to raise the temperature appreciably.

The degree of protection is largely dependent on the aluminum plate area, while the integrity of the arrester under hard service and varying line voltage demands large thermal capacity and radiating surface in order to prevent any temperature rise. The Westinghouse type A arrester is built with ample immersed plate or tray surface, using the same trays which are employed in the high-voltage alternating-current arresters. The immersed area of each tray is 100 sq. in., which is stated to be more than twice as large as that in any other direct-current arrester of this type. The shape and the arrangement of the trays are such that any gases generated by the discharge can pass out readily without disturbing the electrolyte between the trays. The volume of oil and the cooling surface are also correspondingly large.

An article describing the detail construction of Westinghouse electrolytic arresters was published with illustrations in the issue of the Electric Railway Journal for May 20, 1911.

LONDON LETTER

(From Our Regular Correspondent)

A decision arrived at recently by the standing committee of the House of Commons may influence the prospect of the trackless trolley system in many of the towns of England which are applying for permission to introduce the trackless trolley in their outlying districts. With the idea of rendering this system more applicable to such districts, the Board of Trade recently introduced a bill by which it proposed that the light railway commissioners should have the power to grant orders for the trackless trolley system, such orders to be subject to confirmation by the Board of Trade, as in the case of light railways, thus saving heavy parliamentary expenses. The standing committee has, however, inserted amendments to the effect that any proposal to install a trackless trolley system shall be subject to the local veto and that the promoters of such a system shall bear the cost of any necessary alterations to the roads or streets along which the trackless trolley buses would pass and contribute toward the maintenance of the roads over which the vehicles would run. This last amendment has been carried and will, it is claimed, retard the progress of trackless trolleys. There are no such charges upon petrol motor buses, and if these charges are to be put upon trackless trolley buses they will not be able to compete fairly with the former. In the same bill a clause has been moved which provides that the system shall not be introduced in London, which has always been treated separately in the matter of legislation relating to locomotive traction. It was stated that there was no need or room for trackless trolleys in the county of London or any proposal to use them to link up with outside districts, as the London County Council, wherever necessary, linked its tramway system with the tramways in adjoining counties. If hereafter there should be any demand for the introduction of the trackless trolley into London, the promoters would have to apply to Parliament for special powers.

In the meantime the House of Lords committee has passed the bill which the Corporation of Stockport introduced recently for a trackless trolley system from St. Petersgate to Offerton, a distance of 1¾ miles. Severe restrictions have been placed upon the corporation, a speed of only 4 m.p.h. being allowed in certain narrow streets. Cars are forbidden to pass each other except where the roadway is 21 ft. wide. The cars are only to stop at fixed points and are not to be allowed to run through St. Petersgate on Fridays and Saturdays, these being market days.

In connection with the Grimsby electric railway from Immingham Dock to Grimsby, the engine rooms in the power station which supplies the power for this railway provide a unique object lesson. There are installed four hydraulic pumping engines which have been supplied by Armstrong, Whitworth & Company. They are of horizontal type and each is rated at about 630 hp, while the horizontal Curtis turbo-generators in the adjoining rooms total 2500 kw. These latter occupy slightly more than the same floor space occupied by one of the reciprocating engines. The British Thomson-Houston Company, Ltd., Rugby, was responsible for the whole of the equipment in the power station and for substations Nos. 1, 4 and 5, as well as the mechanically operated remote control gear which is so well known as not to require any further description.

The directors of the City of Birmingham Tramways Company which is controlled by the British Electric Traction Company, in issuing their report for the past year, state that as the company has sold its system to the Corporation of Birmingham, the business naturally has come to an end. In ordinary circumstances they would recommend the liquidation of the company, but owing to the profitable investment business which has been developed by the employment of the surplus funds received on the sale of their undertaking they are now considering a proposal to form a new company to acquire from the liquidators the whole of the investments, loans and other assets available, the new company to be called the Electrical & Industrial Finance Corporation, Ltd.

The Glasgow tramways committee has recently been considering an all-night car service. General Manager Dalrymple, of the tramway system, after considering the matter carefully, and after having asked any citizens who desired such cars to send in their names, has recommended the committee not to entertain the proposal, and the committee has agreed to this recommendation. The expense to keep one of the main engines and generators at work and one rotary at each of the six substations, in order to run a half-hourly service along the routes, would exceed the revenue from the service. There were also difficulties in regard to the renewal of track, as this work is all carried out during the night after the cars have completed their runs. Only 295 names were received of people who desired an all-night service.

At a recent meeting of the London County Council the estimates for the coming year were presented. It was shown that on the tramway undertaking the Council had expended up to the end of 1911 £12,000,000 and was committed to a further outlay of £2,250,000. It was stated that the undertaking was paying all working expenses and interests on the money raised for it, was building up an adequate renewals fund and repaying year by year large amounts of borrowed capital, and that it was also able to put aside something to a general reserve fund. The best paying routes were electrified first, so that on a recent investigation it was shown that, while the profits on the old lines were fairly maintained, the more recent applications of capital had been less remunerative. Difficulty is being experienced with some of the borough councils which will not permit the adoption of the overhead system. On this account the highways committee of the County Council has recommended that the plan to secure rights to construct tramways from Wood Lane to Harrow Road and to rebuild the tramways from Cassland Road to West India Dock be deferred in the present session of Parliament. The attitude of the road authorities in insisting upon the underground conduit system has made it impossible for the highway committee of the Council to incur the increased expenditure. The West India Dock tramway constructed on the conduit system would cost £113,940, while the vetoed overhead system could have been installed for £84,000. It has recently been pointed out that the earnings of the London General Omnibus Company, with a capital of £2,500,000, are as much as if not greater than the revenue of the whole of the London County Council tramways, with a capital of £12,000,000. The cost of installing the underground conduit system in the outlying districts or in the manufacturing districts of the east, where esthetic considerations do not weigh so greatly as in central London, is prohibitive.

The Midland Railway has a bill in Parliament to develop the Southend traffic and is prepared to electrify immediately the railway between London and Southend. This line is at present owned by the London, Tilbury & Southend Railway, but the Midland Railway has practically taken it over. The bill also asks for power to reconstruct the Fenchurch station.

The Nottingham electricity committee has decided to secure an expert report as to whether or not it would be possible to obtain power from the Trent River in the vicinity of Nottingham to generate current to supply the city and district.

The light railway commissioners have sanctioned the amended order for the Watford tramways. This means that they consider the widenings which the Herts County Council propose to carry out in High Street to be adequate. With the completion of the electrification of the London & Northwestern Railway and the advent into the Watford district of the Metropolitan Railway, the traffic in High Street will increase materially and an improvement scheme is, in the commissioners' words, "needed for public purposes distinct from those of the light railway."

The Preston Corporation tramways department recently carried out trials with an automatic brake adjuster, invented by George H. Anger and perfected by J. E. Anger, the works manager of the United Electric Car Company, Preston. It has been designed to take up automatically all the wear of the brakeshoes and to keep them always the proper distance from the wheels until they are worn out.

The Midland Railway, the Lancashire & Yorkshire Railway and the London & Northwestern Railway, which have pooled their interests, contemplate the electrification of additional lines in the east and southeast of Lancashire and West Yorkshire, as well as in the Liverpool and Southport areas.

A. C. S.

News of Electric Railways

Passenger Subway and Elevated Railroad Developments in Chicago

A report on passenger subway and elevated railroad developments in Chicago has been prepared by Charles K. Mohler, consulting engineer for the committee on traffic and transportation of the City Club of Chicago. The City Club has submitted the report to the City Council's committee on local transportation, with the statement that the report is a valuable and timely contribution upon a subject of great public importance, and its conclusions are regarded as worthy of the careful consideration of the local transportation committee.

Mr. Mohler attended the various hearings on subways before the local transportation committee and says that several of the projects presented had exceptionally good features while others had very little real merit. The report first takes up the existing surface and elevated lines and the methods of operation. Mr. Mohler recommends more thorough routing and the elimination of delays caused at track intersections in the Loop district. In connection with the operation of the existing elevated lines he also recommends through routing which would make it possible to increase the present capacity of the union loop 200 per cent. Through routing would reduce junction delays largely and the time taken for running dead mileage would be used for carrying traffic.

In taking up the subject of the development of additional facilities such as subways and elevated lines, Mr. Mohler says that the traffic demands of the city are growing at such a rate that added facilities must be provided not only for the surface line but for rapid transit as well. The present rate of increase is such that as soon as a new facility is put in operation it proves to have been outgrown by new demands. Will the addition of new facilities along established routes relieve congestion in certain districts or increase it? Routes should be constructed at the least expense, relieve congestion, follow the most direct lines, eliminate the greatest number of grade crossings and offer facilities for enlarging rather than restricting the delivery territory.

After taking up the proposed location of the first section of subway to be constructed and advancing a number of reasons why it should not be on State Street or Wabash Avenue, Mr. Mohler recommends a surface-car subway to accommodate the surface-car traffic to the northwest and southwest portions of the city. This subway would begin at Halsted and Lake Streets and continue east on Lake to the east side of Michigan Avenue, thence south through Grant Park to Harrison Street and thence west to the junction of Blue Island Avenue and Halsted Street, with a branch on Milwaukee Avenue from the Lake Street junction to Halsted Street.

The advantages of this route are, Mr. Mohler says, that it would necessarily be a high-level subway owing to the fact that the north and south subways would have to pass under the Chicago River. It would eliminate all grade crossings on Lake Street; the Grant Park section would be the least expensive; traffic would be led away from the present congested districts in the Loop, and it would afford relief to two badly congested districts lying in the northwest and southwest portions of the city. Through routing of cars from the northwest to the southwest portions of the city is recommended over this section of the subway. Following the construction of the outer subway an intermediate subway is then recommended for Clark Street and an extension both north and south on Michigan Avenue.

In addition to the surface car subways rapid transit subways to be built in connection with the elevated lines are recommended by Mr. Mohler. One of these will follow the surface car subway from Halsted and Lake Streets to Michigan Avenue and Van Buren Street, where it will follow the present elevated structure to Market Street and continue west to Halsted Street, where it will again connect with the elevated line. In addition to the loop, intersecting rapid transit subways are recommended on State Street and Fifth Avenue and an additional line on Michigan Avenue, extending from the north end of Indiana Avenue on the south to Chicago Avenue on the north, thence west on Chicago Avenue to a proposed elevated line along the right-of-way of the Chicago, Milwaukee & St. Paul Railway.

The advantages for these routes are that they touch all the steam railroad stations except Dearborn Street and Union stations, which will be rebuilt on new sites in the near future and have the same advantages of location as the surface-car subways, affording needed relief in congested districts.

The question of securing added trackage with the proposed plan would be solved by increasing the double-track subways to four tracks, rather than by building additional double-track subways on every street. A four-track subway would afford about the same capacity as a two-track subway, and while it would be attended with greater danger to adjacent buildings there would be only one-half as many subject to damage and one-fourth as many low-level crossings. The cost of construction would be reduced owing to the elimination of one of the side walls and the removal of underground conduit and pipe mains in the original construction.

In addition to the proposed subways in the business district the report recommends possible routes to develop the elevated lines in the outlying districts, which would relieve the congestion in the business district by routing traffic around it. Mr. Mohler recommends that before the final adoption of the subway routes there should be a thorough investigation of the possibility of furnishing additional rapid transit lines adjacent to or as second stories to the existing steam roads' rights-of-way.

In conclusion the report contains an estimate of the cost of constructing the proposed improvement based on the following table:

	Per Mile of Double Track
Surface line	$30,000
Open floor elevated	400,000
Solid floor elevated	700,000
Subways, maintaining street traffic	4,000,000

The proposed new lines and extensions recommended include:

Surface-car subways, 8.38 miles double track	$29,740,000
Rapid transit subways, 11.23 miles double track	43,030,000
Rapid transit elevated, 20.30 miles double track	10,150,000
Total	$82,920,000

In connection with the question of financing the proposed subway system, the use of the city's traction fund for this purpose is discussed by Mr. Mohler. It is pointed out that the fund is inadequate to meet the requirements and that at the same time such a plan would involve the expenditure of money which was contributed by the whole city to benefit 25 per cent of the people who ride into the Loop district.

The Rhode Island Utility Law

The bill to create a public utilities commission in Rhode Island was approved by the Governor on April 17, 1912. The official title of the new body is "The Public Utilities Commission." The commission is to have authority over all the public utilities and common carriers in Rhode Island, including railroads, street railways, suburban railways and interurban railways. The commission is to consist of three members to be appointed by the Governor by and with the advice and consent of the Senate and the first appointees are to hold office until February, 1918; February, 1916, and February, 1914, and thereafter the appointees are to hold office for six years. The Governor was authorized to designate the first chairman of the commission, but future chairmen are to be elected by the members of the commission upon the appointment of any commissioner for a new term or whenever a vacancy occurs. The salary of the chairman of the commission is to be $4,000 a year and the salary of each of the other commissioners is to be $3,500 per year. No person is to hold the office of commissioner or secretary of the commission who is an officer of any public utility subject to the provisions of the act creating the commission, or who has any pecuniary interest in any

company coming under the jurisdiction of the commission. The office of the commission is to be at the State House and the commission is to meet at least once a month.

All hearings and orders of the commission are to be public and the commission is to report to the Governor yearly on or before Jan. 15. The attorney general is authorized to act as counsel to the commission. The members of the commission are authorized to summon witnesses and compel the production of records and to proceed in the case of failure to obey any subpoena of the commission. No person is to be excused from testifying before the commission, even though the evidence might tend to incriminate him, but no one is to be liable to prosecution for evidence except in case of perjury. The commission is authorized to investigate upon complaint made against any public utility as to fares or service, but is required to give a formal hearing before entering any order based on its investigation. The commission receives the right to require public utilities to charge just and reasonable rates and to furnish adequate and reasonable service. Under specified restrictions the commission is authorized to make a summary investigation of rates for service without waiting for a formal complaint to be made to it. Certified copies of all orders of the commission are to be served on the public utilities affected. Every public utility which violates any of the provisions of the public utilities act or which fails to obey any orders of the commission is subject to a penalty of not less than $200 or more than $500 for each and every offence and every violation of such an order is to constitute a separate and distinct offence. Every officer or employee of a public service company who assists in any violation of the provision of the public utilities act or any order of the commission is subject to a fine of not less than $100 or more than $500.

The commission is authorized to bring action through the Supreme Court for the enforcement of its orders. The commission is authorized to amend its orders after due notice to the public utility and after holding the specified hearing. Appeal from the orders of the commission by a public utility may be made to the Supreme Court. The public utilities are not to furnish service for or at less than the regular rates by means of rebates or concessions, but may furnish service free or at reduced rates to their employees, for certain public purposes and to special classes of persons, to publishers of newspapers, and may exchange service with other public utilities. The public utilities are to file their rates with the commission and the copies of such rates are to be open to public inspection. No change in rates is to be made within thirty days except at the discretion of the commission. The public utilities are to report to the commission all serious accidents which arise from their operation. The commission is empowered to order alterations and additions to plans and equipment and is to have power over franchises, contracts and ordinances. The companies are to have the right to appeal to the commission against any unreasonable order of town or city. Orders of cities and towns with respect to grade crossings are to be supervised by the commission. The Public Utility Commission is to succeed to all powers and duties of the Railroad Commission. The act became effective on its passage.

President Mellen on the Vicissitudes of the New Haven Railroad

Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, was quoted in part as follows in an interview dated Boston, which appeared in the New York *Times* of May 26, 1912: "'My business is the running of a railroad, and all I want from the courts and the Legislature of Massachusetts is a square deal. If I get that, you will find me sticking closely to my last, as every good shoemaker should. I am not objecting to the enforcement of the law. I want the law enforced absolutely, but I want to know what the law is and I want laws under which we can operate for the best interests of the territory we have to serve. We have been accused of breaking the law, but every move we ever made in Massachusetts that has been declared a breach of the law was made on the best legal advice. We never moved blindly. We wanted to be sure we were right before we went ahead, and we engaged the best counsel obtainable and followed their advice. It is just as if you should go to your counsel to-morrow and he should advise you that you could do so and so. You follow his advice and are haled into court and when your case comes to trial you find out your lawyer is wrong.

"'That is the way we got into the Boston & Maine and into the electric railway business in Massachusetts. The Boston & Maine Railroad was for sale and was in danger of falling into the hands of alien interests. It was legal to obtain control of it; we wanted control. Our counsel advised us it was legal and so we went ahead; the same with the electric railways. The courts decided we had acted illegally and ordered us to take the back track. We took it. Then our enemies in Massachusetts assailed the credit of the road and the honesty of its management and did everything in their power to blacken us in the eyes of the public.

"'The New York, New Haven & Hartford Railroad is running 2000 passenger trains a day. If only 5 per cent of them are off-time, that amounts to 100 trains a day If you were told that 100 trains were late yesterday you would probably regard it as a severe indictment of the road. But I should like to have you point out to me some one who is doing business with 95 per cent perfection. You hear a great deal about the 100 trains that are a trifle late, but you hear nothing about the 1900 trains that are on time.'"

Trail Car Operation in Cleveland to Begin in August

Peter Witt, street railway commissioner of Cleveland, Ohio, says that the first of the trail cars in Cleveland will be put in operation about Aug. 1. They will be installed at the rate of two per day thereafter. He is planning to have 100 extra trail cars at the Public Square during the hours of heaviest traffic in the evening. The G. C. Kuhlman Car Company is preparing the material for the trail cars, but several changes which have been made in the detail of the plans since the order was given have delayed the final drafts.

Mr. Witt has decided to ask the City Council to allow the installation of car starters, manufactured by the Consolidated Car Heating Company, in all the cars of the Cleveland Railway, in order to lessen the duties of conductors. The starters actuate signal lights when the doors are being opened or closed.

About 500 men are idle as a result of the order of President Stanley of the Cleveland Railway directing that work be stopped on the track following the strike of track workers on Madison Avenue, N. W., referred to in the ELECTRIC RAILWAY JOURNAL of May 25, 1912, page 888. The men received $1.70 per day and demanded from $1.80 to $2 per day.

A temporary successor has been appointed to William G. Martin, secretary of the local organization of the Amalgamated Association of Street Railway Employees, who has been missing since March 23, 1912.

Plans for Traffic Relief in Los Angeles

A special committee of the City Council has conferred with Paul Shoup, vice-president of the Pacific Electric Railway, and William E. Dunn, vice-president of the Los Angeles Railway, in regard to the San Pedro Street franchise and other traffic matters. At the conclusion of the conference the committee instructed Howard Robertson, deputy city attorney, to prepare an ordinance embracing the tentative agreement reached between the railway officials and the committee. This ordinance, which will be submitted to the Council, will contain the following proposals:

Pacific Electric Railway to build a line on San Pedro Street, from Ninth to Fourth Street.

Pacific Electric Railway and Los Angeles Railway jointly to build from Fourth to Aliso Street, where a third-rail will be laid for yellow car local traffic.

Los Angeles Railway to lay tracks from Aliso to the Plaza when San Pedro Street is opened by the city.

The city is to have right to purchase the lines after the expiration of three years from Jan. 1, 1913, on giving one year's notice to railways, on these terms: within five years, by paying cost of line; from five to twenty years by pay-

ing 75 per cent of cost; thereafter, on paying value of property.

City to grant franchise for this relief free of cost.

Routing of cars to be under direction of Public Utilities Board.

Repairs, if not made by railways, may be made by the public works board and charged to the companies.

Erection of another passenger station connecting with the present Pacific Electric Railway depot by a bridge across Los Angeles Street, with entrances on that street and also through the present depot of the Pacific Electric Railway.

Joint expenditure of about $350,000 by the two railways in equipment and buildings.

Railways to file reports of costs, and the city to make prompt payment on buying the lines.

The committee specially appointed by the Council to consider the traffic problem consists of Councilmen R. M. Lusk, Haines W. Reed and John Topham.

Rapid Transit Plans for New York Approved

The Board of Estimate and Apportionment of New York on May 24, 1912, formally approved the plans and tentative agreements calling for the construction by the city and by the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company of a dual system of rapid transit subway and elevated lines. The negotiations which have now been concluded were opened in June, 1910, when the Interborough Rapid Transit Company offered to improve and extend its elevated lines. This offer the company supplemented on Dec. 5, 1910, with a formal offer to extend the present subway down Seventh Avenue, in Manhattan, crossing to Brooklyn, and to build another up Lexington Avenue, Manhattan, and through parts of the Bronx, to cost $107,000,000, half to be paid by the city.

A joint committee of the Board of Estimate and Apportionment and the Public Service Commission was appointed following the receipt of this offer, and this committee proceeded to work out plans more pretentious in some respects than those included in the offer of the Interborough Rapid Transit Company and contemplating terms which were considered more advantageous to the city. In March, 1911, the Brooklyn Rapid Transit Company offered to build certain subways and elevated railways in Brooklyn, Manhattan and Queens, one subway to enter Manhattan at the Battery, continue up Broadway to Times Square, thence up Seventh Avenue to Fifty-ninth Street and over to Queensboro Bridge.

The report of the joint committee appointed by the city was presented in June, 1911. It proposed a dual system, part to go to the Interborough Rapid Transit Company and part to the Brooklyn Rapid Transit Company, either to take all or any routes not accepted by the other. The Interborough Rapid Transit Company declined to accept the routes and provisions as prescribed for it in this report and they were offered to the Brooklyn Rapid Transit Company and accepted by it. Opposition within the Board of Estimate kept the matter open, however, and the Interborough Rapid Transit Company finally agreed to the terms with certain modifications. The total road mileage of the rapid transit routes, subway and elevated, now serving the city—exclusive of the lines of the Hudson & Manhattan Railroad—will be increased from 66.9 miles to 172.4 miles. The increase in the mileage operated by the Interborough Rapid Transit Company will be from 25.9 miles to 74.4 miles and in the mileage operated by the Brooklyn Rapid Transit Company from 41 miles to 98 miles.

The cost of construction of all the new lines and improvements, both subway and elevated, embraced within the dual plan—exclusive of the Fourth Avenue (Brooklyn) and Bridge Loop lines, which are nearing completion and for which the city has already provided—is officially estimated at approximately $214,000,000. The cost of equipment will be $47,000,000, making a total outlay on the part of the city and the operating companies of $261,000,000. The Interborough Rapid Transit Company will spend in addition about $25,000,000 upon the extensions and improvements to the Manhattan Elevated Railway system. The city's additional investment in the Fourth Avenue and Bridge Loop lines, which are to be taken into the Brooklyn Rapid Transit System, will be about $28,500,000 more.

The arrangements now to be carried out comprehend two independent arterial systems of subway and elevated transit lines focusing in the downtown part of Manhattan Borough and to extend by four-track trunk lines and branches to the far limits of the other boroughs. The Brooklyn Rapid Transit Company is not to enter Manhattan Borough north of Fifty-ninth Street, nor is it to have any lines in the Bronx or in the northern districts of Queens Borough. The lines of the Interborough Rapid Transit Company are to extend across to the limits of Brooklyn and Queens to the eastward, but are not to go further than Flatbush into South Brooklyn.

The operating terms proposed by the joint committee of the Board of Estimate and the Public Service Commission for the rapid transit lines were referred to at length in the Electric Railway Journal of June 17, 1911, page 1070. They have since been modified slightly. Determination of costs, etc., as between lines is to be made on a per-passenger basis, in line with the city's contention that the traffic of crowded centers must help bear the returns from outlying branches. The city has conceded that the companies may include as expenses a 3 per cent commission to bankers for financing the loans and has agreed to a preferential payment out of profits to the operating companies before it shall receive its share of net earnings.

J. P. Morgan & Company are to finance the loan of the Interborough Rapid Transit Company and the Central Trust Company and Kuhn, Loeb & Company are to finance the loan of the Brooklyn Rapid Transit Company. J. P. Morgan & Company have arranged to purchase at 96 $170,000,000 of fifty-three-year 5 per cent gold bonds of the Interborough Rapid Transit Company, $50,656,950 of which will be used to refund the present debt of the company. The details of this loan are discussed elsewhere in this issue. The details of the financing of the loan of the Brooklyn Rapid Transit Company have not yet been announced. All told, the city will require $125,000,000 for subway work, but it is not thought that more than $25,000,000 of this amount will be required in any one year within the next five years.

Transit Matters in Detroit

At the regular meeting of the Common Council of Detroit, Mich., on the evening of May 21, 1912, Chairman Harpfer of the committee on franchises offered a unanimous report to give the Detroit United Railway the right to build a double track on the west side of Hamilton Boulevard between Pingree Avenue and the city limits, and a resolution was adopted to that effect.

Police Commissioner Croul has recommended that cars be re-routed around and near the Campus Martius in order to reduce traffic in that section. It has become necessary to take some action, so crowded have the streets become, especially in the heart of the business district. Mr. Croul has also recommended that streets be widened in places, that street corners be cut off and that rules be adopted to require automobiles to be parked only in specified places.

On May 20, 1912, three of the five members of the committee on judiciary of the Common Council voted to report the Vernor ordinance modified to reduce from $10 per round trip to $5 the tax to be imposed upon express cars of the Detroit United Railway. A few weeks ago City Accountant Bullock investigated the freight service of the company and reported that the gross receipts for traffic inside the city were $4.84 per car per round trip. Later the company agreed to furnish the data in regard to the receipts and expenses in about sixty days, but the committee decided not to wait for this information. Mr. Bullock told the committee at its session on May 20 that the earnings of the company from this business last year were $23.41 per car per round trip.

At a meeting of the West Warren Residents' Association on the evening of May 25, 1912, a resolution was adopted which provides for the appointment of a committee to prepare plans for the construction of a railway to serve that section either with or without the assistance of the Detroit United Railway. A feature of the meeting was the reading

of a letter received from Mayor Thompson, in part as follows:

"I cannot regard the present situation of our city with reference to street car service in any other way than with the gravest concern. Only last Monday Thomas Neal, president of the General Motors Company, informed me that he proposed to move the Cadillac automobile plant to Cleveland in the near future because inadequate street railway service debarred him from using his 50-acre site out Russell Street. This plant, I am told, employs 7,500 persons."

Sale of Strip Tickets in Columbus.—On May 24 the number of strips of tickets sold by the Columbus Railway & Light Company, Columbus, Ohio, since the reduced fare of eight tickets for 25 cents went into effect, fifty-five days before, reached 1,000,000.

Partial Electrification of Limerock Railroad.—The Limerock Railroad, a switching company with 11 miles of track at Rockland, Maine, is to undertake a partial electrification of its lines. Power is to be obtained from the Central Maine Power Company, Waterville, Me.

San Francisco Twin Peaks Tunnel Report Favorably Received.—The report of Bion J. Arnold on the Twin Peaks tunnel project has been favorably received by the Board of Supervisors of San Francisco, and a resolution has been adopted directing the city engineer to have the necessary surveys made preliminary to laying out the assessment district.

Strike in Ogdensburg.—The employees of the Ogdensburg (N. Y.) Street Railway went on strike on May 17, 1912, to enforce their demands for an increase in wages, but returned to work the following day after an understanding had been reached between them and E. E. Hawkins, president of the company, by which the differences will be satisfactorily adjusted.

Contract Awarded for Cars for San Francisco's Municipal Railroad.—The contract for constructing forty-three cars for the Geary Street, Park & Ocean Municipal Railroad, San Francisco, Cal., to which reference was made in the ELECTRIC RAILWAY JOURNAL of May 25, 1912, page 889, has been awarded to the W. L. Holman Company, San Francisco. The contract is for semi-steel cars, and provides for four extra trucks.

Galveston Causeway Opened.—The 2-mile concrete causeway at Galveston, to which reference was made in the ELECTRIC RAILWAY JOURNAL of May 18, 1912, page 848, was opened on May 25, 1912. The structure connects the city of Galveston with the mainland. In the center there is a lift bridge with a 100-ft. span. There are tracks for passenger and freight trains, electric railway tracks and driveways for automobiles and carriages, besides walks for foot passengers.

Franchise for Mount Royal Railway.—For twelve years the Mount Royal Park Incline Railway, Montreal, Que., has been operating without a contract with the city. An arrangement with the city has now been concluded by which a franchise has been obtained by the company for five years. The company must insure its property for $100,000 and pay the city 5 per cent of its gross receipts. The fare for an adult going up the mountain is to be 5 cents and 3 cents returning.

Use of Morris Canal for Rapid Transit Service to Be Considered.—The State commission created by the last New Jersey Legislature to investigate fully the proposed abandonment of the Morris Canal met at Trenton, N. J., on May 21, 1912, and after a preliminary talk as to the scope and power which the commission enjoys it was decided to secure an office in Newark, install a clerical force and begin work as soon as possible. The possible use of a portion of the roadbed of the canal for rapid transit service will be considered.

Power from the Ocoee River.—The Rome Railway & Light Company, Rome, Ga., is operating its lines with current from the Ocoee River station of the Tennessee Power Company. The Rome Railway & Light Company maintains the equipment of its steam plant ready for operation, this being done by contract with the Tennessee Power Company, which has arranged to have its large consumers manufacture their own power when its water-power is not sufficient to provide current for all its lines. The arrangement for the Ocoee River power was made through the Interstate Power Company, which has made a contract with the Tennessee Power Company for the distribution of current in Northern Georgia.

Study of Interurban Conditions at Cincinnati.—W. R. Smith, representing Bion J. Arnold, began work on May 22 on the survey of interurban railway traffic conditions at Cincinnati, Ohio. Mr. Smith and William Cooper Proctor and Dean Schneider, members of the rapid transit committee named some time ago by Mayor Hunt, have covered in an automobile most of the area included in the system reached by the city lines in order to get an idea of the topography of the country. In regard to the new railroad terminal John E. Bleekman, vice-president of the Cincinnati Union Depot & Terminal Company, states that there is harmony among the railroads, but that the owners of the property which is needed will have to be fair in their prices if the city is to secure the new structure.

Massachusetts Merger Bill Defeated.—The bill to provide for the merger of the New York, New Haven & Hartford Railroad and the Boston & Maine Railroad, with electrification of steam railroad lines in the Boston metropolitan district, was killed in the Senate on May 22 by a vote of twenty to fifteen. An effort to refer the measure to the next Legislature failed to pass. The bill had received favorable consideration, but was defeated by a change of sentiment among several former supporters of the measure, who went over to the opposition on the basis of the supposed veto to be given the bill by Governor Foss on account of the rejection of his plans for the establishment of a single public utility commission in place of the several boards which now serve the State.

Edison Battery Cars for Salt Lake-Saltair Line.—The Saltair Beach Company, which operates a pleasure resort on the shore of the Great Salt Lake of Utah, 15 miles from Salt Lake City, will purchase three Edison battery cars to replace the present steam service between Salt Lake City and the resort. Each car will be equipped with 220 Edison nickel-iron storage cells and the carrying capacity of each of the cars will be fifty people. The maximum speed to be attained over the level salt flats through which the Saltair tracks run will be 45 m.p.h., and during the season cars will leave each terminal at intervals of forty-five minutes. The Utah Light & Railway Company, Salt Lake City, will charge the cars from 11 p. m. to 7 a. m. under a special off-peak schedule. Fresh cells will be substituted for the discharged batteries during the day-time.

Plan to Purchase Power for Municipal Railroad at San Francisco.—At a recent conference between Mayor Rolph of San Francisco, Cal., and the public utilities committee of the Board of Supervisors of San Francisco it was decided to cancel the plans for installing a transformer plant in connection with the proposed carhouse for the Geary Street, Park & Ocean Municipal Railroad, and it is probable that the same action will be taken in regard to the $250,000 power plant which was to have been built in the North Beach district. The board of works was recently directed by the supervisors to invite bids from the power companies for the supply of current for the railway, and it has been decided to enter into a contract with the Pacific Gas & Electric Company for power necessary for the operation of the railway for one year at 1 cent per kw-hr. with the privilege of renewal under similar terms.

Fenders in New Orleans.—Following a further test of fenders conducted at the Carrollton Avenue carhouse of the New Orleans Railway & Light Company, New Orleans, La., on May 20, 1912, under the direction of the street and landings committee of the City Council, Maurice Hartson, chairman of the committee, was quoted as follows: "I cannot give any opinion about the merits of any of the devices as I see them, nor say which appeals to me. It is up to the company to submit to the committee such fender or fenders as it sees fit, and then it is up to the committee to accept one of them or reject them all. The committee is in a position now to know, or to figure out pretty closely, just what each fender will do or is capable of, and when the members of the committee meet and the different fenders are submitted they will make a recommendation as to which

they think should be adopted. I cannot give any opinion in advance of the meeting of the committee, however."

Ruling in Regard to Fare on Interurban Cars in Cleveland.—In the suit of A. G. Stafford to compel the interurban railways which enter Cleveland, Ohio, to reduce their fare to 3 cents and issue and receive transfers within the city limits of Cleveland and make all the local stops, the Circuit Court has rendered a decision to the effect that the interurban cars are operated over the tracks of the Cleveland Railway as special cars under an ordinance adopted on Dec. 26, 1911. A few months ago Judge Lawrence held that any defects in the original legislation in regard to the operation of interurban cars over the tracks of the Cleveland Railway had been cured by this ordinance. The Tayler franchise provided for the operation of interurban cars in the city, but those who were interested in forcing the interurban companies to operate their cars within the city as local cars argue that the Tayler ordinance does not cover this to such an extent as to give the companies the privileges claimed.

Bulletin of the Industrial Commission of Wisconsin.—The Industrial Commission of Wisconsin has begun the publication of an official monthly bulletin which will be issued by the commission at Madison. The first number of the bulletin is dated May 20, 1912. The introduction contains a review of the development of the general orders on safety which have been issued by the commission. In November, 1911, a committee on safety and sanitation standards was selected from the various business and labor interests of the State and requested to draft a complete book of rules covering safety and sanitation in places of employment. This committee met during November and December, and on Jan. 1, 1912, submitted to the Industrial Commission a partial set of rules covering the more important points of safety. The committee recommended that these rules be issued at once pending the completion of the entire book of rules. The commission issued the rules and called for a public hearing on Jan. 27, 1912. At this hearing valuable criticisms and suggestions were made, and after the hearing the rules were redrafted by the committee. On May 3, 1912, the commission finally adopted the rules as its general orders and they were published on May 14, 1912, and are effective on June 14, 1912. The contents of the first issue of the bulletin includes, in addition to the review of the general order on safety, a summary of the provisions of Chapter 485 of the Laws of 1911, safety rules common to all industries, elevator rules, rules for use of the wood-working industries and a general index. The members of the commission are: C. H. Crownhart, chairman; J. D. Beck and J. R. Commons. Paul J. Watrous is secretary of the commission and C. W. Price is assistant to the commission.

PROGRAM OF ASSOCIATION MEETINGS

Central Electric Railway Accountants' Association

The following program has been announced for the meeting of the Central Electric Railway Accountants' Association which is to be held at Cedar Point, Ohio, on June 13 and 14, 1912:

JUNE 13, 9 A. M.

Meeting of the executive committee.

1.30 P. M.

Regular business session.

Report of standing freight committee on "Method of Handling Local Freight Accounts."

Report of standing passenger committee on "Method of Handling Local Passenger Accounts."

Report of compiling committee.

Address, "Accounting System for Electric Lighting Property," by E. D. Gault, auditor of the Mahoning & Shenango Railway & Light Company.

JUNE 14, 9.30 A. M.

Address, "Accounting for Capital Expenditures," by B. E. Bramble, general auditor of the Illinois Traction System.

Address, "Method of Settlement of Interline Accounts," by F. T. Loftus, auditor of the Indianapolis & Cincinnati Traction Company.

Discussion of Query Box questions.

There will be an exhibit at this meeting of all blank forms used by member companies.

Financial and Corporate

Stock and Money Markets.

May 28, 1912.

The market for securities traded in on the New York Stock Exchange presented a somewhat stronger undertone to-day than it did on Monday, and the fluctuations in prices were confined to a narrow circle of speculative traders. The strength of the securities of the grain roads of the Northwest was a feature. Less than two weeks ago United States Steel and Reading were selling more in the market each day than the total sales of the entire list to-day. Rates in the money market to-day were: Call, 2½@2⅞ per cent; sixty days, 3¼@3½ per cent; ninety days, 3¼@3¾ per cent.

In the Philadelphia market trading was dull and featureless, but the undertone was steady and only the narrowest of fluctuations were recorded.

In the Chicago market small advances were recorded in the prices of Chicago Railway Series 2. The bond market was steady, except for the drop of a point to 87½ for Chicago Railways B5's.

In the Boston market the feature was the advance to 136½ in the price of New Haven.

In the Baltimore market prices were steady, but trading was inactive and featureless.

Quotations of traction and manufacturing securities as compared with last week follow:

	May 22.	May 29.
American Brake Shoe & Foundry (common)	a93¾	95½
American Brake Shoe & Foundry (preferred)	136½	a137
American Cities Company (common)	....	....
American Cities Company (preferred)	....	....
American Light & Traction Company (common)	a308	a308
American Light & Traction Company (preferred)	a110	a110
American Railways Company	a43⅞	a44
Aurora, Elgin & Chicago Railroad (common)	44½	a45¼
Aurora, Elgin & Chicago Railroad (preferred)	85½	a87½
Boston Elevated Railway	*128	a129
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	78	78
Boston & Worcester Electric Companies (common)	a10½	a10½
Boston & Worcester Electric Companies (preferred)	a54	a54
Brooklyn Rapid Transit Company	88⅛	89¼
Capital Traction Company, Washington	a128	a127¾
Chicago City Railway	a190	a190
Chicago Elevated Railways (common)	a40	a40
Chicago Elevated Railways (preferred)	a93	a92
Chicago Railways, ptcptg., ctf. 1	a96	a95
Chicago Railways, ptcptg., ctf. 2	a31	a30
Chicago Railways, ptcptg., ctf. 3	a10	a9
Chicago Railways, ptcptg., ctf. 4	a5	a5
Cincinnati Street Railway	a130	a130
Cleveland Railway	a106	a106
Cleveland, Southwestern & Columbus Ry. (common)	*5	*5
Cleveland, Southwestern & Columbus Ry. (preferred)	*32	a32
Columbus Railway & Light Company	a55	a55
Columbus Railway (common)	80	80
Columbus Railway (preferred)	a95	a95
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a100	a100
Denver & Northwestern Railway	*135	*135
Detroit United Railway	a75	a72
General Electric Company	169⅞	a171
Georgia Railway & Electric Company (common)	a125	a125
Georgia Railway & Electric Company (preferred)	a85¾	a85¾
Interborough Metropolitan Company (common)	20¾	21
Interborough Metropolitan Company (preferred)	59⅜	60
International Traction Co. 4% bonds, rcts	*75	*75
Indiana Union Traction Company	*7	*7
Kansas City Railway & Light Company (common)	a21	a22
Kansas City Railway & Light Company (preferred)	a46	46
Lake Shore Electric Railway (common)	*7	*7
Lake Shore Electric Railroad (1st preferred)	*91½	*91½
Lake Shore Electric Railway (2d preferred)	*27	*27
Manhattan Railway	a138	135⅛
Massachusetts Electric Companies (common)	a20	a21¼
Massachusetts Electric Companies (preferred)	a95½	a94
Milwaukee Electric Railway & Light (preferred)	*104½	*104½
Norfolk Railway & Light Company	*27	*27
North American Company	82	82½
Northern Ohio Light & Traction Company (common)	a70	a70
Northern Ohio Light & Traction Company (preferred)	a105	a105
Philadelphia Company, Pittsburgh (preferred)	52½	52
Philadelphia Company, Pittsburgh (common)	43¾	43¾
Philadelphia Rapid Transit Company	22¾	22⅞
Portland Railway, Light & Power Company	*68½	*68½
Public Service Corporation	a112	112
Third Avenue Railway, New York	39½	a39
Toledo Railways & Light Company	a10	6⅞
Twin City Rapid Transit Co., Minneapolis (common)	a105⅞	a109
United Rys. & Electric Company (Baltimore)	a24½	a24
United Rys. Inv. Co. (common)	a33½	a32
United Rys. Inv. Co. (preferred)	61½	60
Virginia Railway & Power Company (common)	a47⅝	47⅝
Virginia Railway & Power Company (preferred)	88	88
Washington Ry. & Electric Company (common)	a90	a89⅞
Washington Ry. & Electric Company (preferred)	a93¾	a95
West End Street Railway, Boston (common)	a85¼	a85
West End Street Railway, Boston (preferred)	a101½	a101½
Westinghouse Elec. & Mfg. Co	a74	a73½
Westinghouse Elec. & Mfg. Co. (1st preferred)	a120	a120

*Last sale. a Asked.

ANNUAL REPORTS

North American Company

A comparative statement of income of the North American Company in 1911 as compared with 1910 follows:

	1911	1910
Interest received and accrued	$659,994	$712,902
Dividends received	1,392,448	1,357,304
Profits and compensation for services	53,550	34,797
Net increase in book value of assets	1	
Total	$2,105,993	$2,105,003
Salaries, legal expenses, net rentals and all other expenses of administration	$87,361	$80,547
Taxes	13,234	5,657
Interest and commissions paid and accrued	142,923	107,477
Sundry accounts written off and reserves	5,609	57,937
Total	$249,127	$251,618
Net income	1,856,866	1,853,385
Credit balance of undivided profits account at close of previous fiscal year	4,026,707	3,662,987
Total	$5,883,573	$5,516,372
Dividends paid and accrued during year	1,489,665	1,489,665
Credit balance of undivided profits at close of fiscal year	$4,393,908	$4,026,707

James Campbell, the president, says in the report in part:

"The North American Company acquired during the year the entire capital stock of the North Milwaukee Light & Power Company, a company doing the electric light and power business in the village of North Milwaukee.

"The bonds and notes owned by this company are the following: Milwaukee Light, Heat & Traction Company refunding and extension mortgage thirty-year 5 per cent bonds, $5,000,000; Racine Gas Light Company consolidated mortgage thirty-year 5 per cent bonds, $318,000; Kenosha Gas & Electric Company first mortgage 5 per cent bonds, $45,000; Detroit Edison Company ten-year convertible 6 per cent bonds, $400,100; West Kentucky Coal Company first mortgage sinking fund 5 per cent thirty-year bonds, $87,000; Hudson Company 6 per cent notes, $250,000.

"Loans and advances consist of money loaned to individuals and corporations upon their notes, with ample collateral security, together with advances to subsidiary companies.

"The company sold $500,000 principal amount of bonds, with $100,000 par value of common stock, of the Mississippi River Power Company, referred to in the report for last year, at a price which netted the company a profit.

"Of the five-year 5 per cent collateral trust notes, dated May 1, 1907, there remain outstanding in the hands of the public $1,910,000, principal amount.

"Notes payable consist of money borrowed on account of loans made to individuals, corporations and subsidiary companies.

"This company has no contingent liabilities, except an instrument of guaranty, dated March 1, 1906, executed to the Trust Company of America, as trustee under the first mortgage of the West Kentucky Coal Company, whereby it has guaranteed the payment by that company of the interest upon $2,000,000 par value of its first mortgage bonds and of the sinking fund payments pertaining thereto; $90,000 par value of these bonds have been retired through the sinking fund, leaving $1,910,000 par value outstanding.

"The combined gross revenue of the Milwaukee group of properties showed an increase over the previous year of 7.44 per cent, operating expenses, taxes and reserves an increase of 7.24 per cent, gross income an increase of 7.89 per cent, interest charges an increase of 7.86 per cent, and net income an increase of 7.93 per cent. There has been expended during the year on additions to the physical property of these companies the sum of $2,991,295. These additions consist of the following principal items:

"(1) Construction of addition to Commerce Street station and the installation of machinery therein; (2) construction of Clinton Street and Twentieth Street substation; (3) addition of 2.15 miles of track to the city and suburban lines; (4) additions to overhead and underground distribution systems in cities served for the supply of power to substations, railway systems and light and power consumers; (5) construction of and installation of equipment in Cold Springs car shops in the city of Milwaukee; (6) construction of addition to and installation of 4000-kw capacity generating apparatus in Racine power station; (7) additional meters, transformers and sundry apparatus and equipment required for gas, electric heating and railway departments of these companies.

"At a special meeting of the stockholders of The Milwaukee Electric Railway & Light Company, held on Dec. 30, 1911, there was authorized a general and refunding mortgage to secure an authorized issue of $90,000,000 of bonds. Of this issue the company contracted to sell during the period covered by this report $3,000,000 of bonds bearing 5 per cent interest, and delivery thereof was made after Dec. 31, 1911. It is believed that this large authorized issue of bonds will provide for a substantial part of the cash required for construction by The Milwaukee Electric Railway & Light Company for many years to come. The proceeds of the sale of the initial issue of bonds were used to pay a part of the issuing company's floating debt.

"The gross revenue of the United Railways Company of St. Louis showed an increase over the previous year of 4.04 per cent, operating expenses, taxes and reserves an increase of 1.06 per cent, gross income an increase of 8 per cent, interest charges a decrease of 1.91 per cent, and net income an increase of 39.45 per cent.

"There has been expended during the year on additions to physical property the sum of $115,400. These additions consist of the following principal items:

"(1) Construction of 1.56 miles of new track; (2) reconstruction of 32.69 miles of old track; (3) retieing and reballasting of 19 miles of T-rail track on county lines; (4) construction of twenty-five steel passenger cars, electric switching locomotive and cars for portable substation, and overhauling, rebuilding and equipping rolling stock; (5) installation of additional capacity in converting machinery in substation; (6) building of new portable substation.

"The gross revenue of the Union Electric Light & Power Company showed an increase over the previous year of 6.86 per cent, operating expenses, taxes and reserves an increase of 9.4 per cent, gross income an increase of 3.75 per cent, accrued interest an increase of 3.13 per cent, and net income an increase of 1.94 per cent. Increased reserve for depreciation is the principal cause for increase in operating expenses. There has been expended during the year 1911 on additions to physical property the sum of $371,608.

"The gross revenue of the St. Louis County Gas Company showed an increase over the previous year of 18.17 per cent, operating expenses, taxes and reserves an increase of 12.96 per cent, gross income an increase of 33.9 per cent, interest charges an increase of 39.8 per cent, and net income an increase of 32.8 per cent.

"The gross revenue of the Suburban Electric Light & Power Company showed an increase over the previous year of 16.32 per cent, operating expenses, taxes and reserves an increase of 16.24 per cent, gross income an increase of 16.51 per cent, interest a decrease of 9.74 per cent, and net income an increase of 19.15 per cent.

"The gross revenue of the Detroit Edison Company and subsidiaries showed an increase over the previous year of 18.7 per cent, operating expenses and taxes (exclusive of depreciation) an increase of 19.8 per cent, balance before deducting accrued interest an increase of 17.3 per cent, and accrued interest an increase of 13.6 per cent.

"During the year the authorized capital stock was increased from $9,000,000 to $15,000,000 par value. Of this increase, $1,500,000 was offered to stockholders at par, the entire amount of which (excepting fractional rights aggregating four shares) was subscribed for as of Jan. 3, 1912. The company also issued and sold $1,500,000, principal amount, ten-year convertible debenture bonds, bearing date Feb. 1, 1911. This amount represents the remainder of the $3,000,000, principal amount, of these debenture bonds authorized in 1910.

"Continuing the previously announced policy of developing the property of the West Kentucky Coal Company, work on Mine No. 8 was begun during the year. The company shipped 501,603 tons of coal during 1911, as compared with 483,933 tons during 1910. Lesser sales of coal at the mines for locomotive fuel purposes tended to narrow the company's market, but the outside commercial market was broadened and the sales for the year showed a satisfactory increase. The financial results of the company's operations for the year 1911 are encouraging to your board

of directors and the policy of developing the property and the market for its output will be continued."

The income account of the United Railways Company of St. Louis for the year ended Dec. 31, 1911, follows:

Gross revenue	$11,958,882
Operating expenses, taxes and reserves	7,990,062
Gross income	$3,968,820
Interest accrued	2,740,305
Net income	$1,228,515

A consolidated income account of The Milwaukee Electric Railway & Light Company, Milwaukee Light, Heat & Traction Company, Milwaukee Central Heating Company, Racine Gas Light Company, Kenosha Gas & Electric Company and Watertown Gas & Electric Company, covering the fiscal year ended Dec. 31, 1911, follows:

Gross revenue	$6,907,383
Operating expenses, taxes and reserves	4,699,917
Gross income	$2,207,466
Interest accrued	1,379,238
Net income	$828,227
Preferred stock dividends	270,000
Balance	$558,227

J. G. White & Company, Inc.

J. G. White, president of J. G. White & Company, Inc., says in his statement to stockholders in the annual report for the fiscal year ended Feb. 29, 1912:

"The surplus for the year shows an increase from $485,529 to $605,522, after having paid the regular 6 per cent dividend on the company's outstanding preferred stock. This is equivalent to about 8 per cent earned for the year on your common stock.

"This increase in surplus is shown after having made what your officers believe to be ample provision for all doubtful accounts, and after the securities owned by your company have been valued by a committee of your directors, on what is believed to be a sound and conservative basis.

"Satisfactory earnings, as well as increases in rates of dividends, have been shown during the past year on a number of the properties in which your company holds securities. This is particularly true of some of the properties operated by your company, and it is believed that further increases in this respect can be reasonably expected.

"With the business in hand and in prospect, it is believed that your company should show during the coming year earnings in excess of the year just ended."

American Water Works & Guarantee Company, Pittsburgh, Pa.—The American Water Works & Guarantee Company has increased its capital stock from $10,000,000 to $20,000,000 by the issuance of $10,000,000 of 6 per cent cumulative participating preferred stock, which is now being offered by J. S. & W. S. Kuhn, Inc., at 97½ and accrued dividend. The subscription books will be opened at 10 a. m. on June 3, and will be closed the same day. J. S. & W. S. Kuhn, Inc., announce that the greater portion of this issue has already been absorbed by bankers in London, Paris, Brussels and Amsterdam. The American Water Works & Guarantee Company is a New Jersey corporation. It was organized in 1882 and incorporated in 1891. Beginning with the purchase of one water works plant, its business has extended under its present management, so that at this time it controls and operates plants supplying water to more than 1,250,000 people in eighty-two rapidly growing cities and towns in the United States. The present offering of preferred stock is made so that the company may take advantage of opportunities for further development and growth. Among the more important developments in which the company is interested is a large hydroelectric enterprise of more than 100,000 hp near Pittsburgh, Pa., now under construction. The company has no bonded debt and no direct liability other than current accounts payable, which are under $100,000. The issue of preferred stock has preference over $10,000,000 of common stock in the assets of the company, which will aggregate more than $23,000,000. As noted in the Electric Railway Journal of May 4, 1912, page 772, the holders of the common stock of the West Penn Traction Company voted recently to accept the proposal of the American Water Works & Guarantee Company to organize the West Penn Traction & Water Power Company and to exchange the stock of the West Penn Traction Company for the stock of the new company.

Bay State Street Railway, Boston, Mass.—Governor Foss of Massachusetts has signed the bill authorizing the Bay State Street Railway to lease its property in the Hyde Park and Chelsea district to the Boston Elevated Railway or the West End Street Railway.

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—The Bloomington & Normal Railway & Light Company, Bloomington, Ill., one of the subsidiaries of the Illinois Traction System, has purchased the lighting properties at Chenoa, Gridley and El Paso, Ill.

Denver (Col.) City Tramway.—Clark, Dodge & Company, New York, N. Y., are offering for subscription at a price to yield more than 5¼ per cent about $315,000 of a new issue of $1,315,000 of first mortgage 5 per cent serial gold bonds of the Denver Tramway Terminals Company, guaranteed as to principal and interest by indorsement by the Denver City Tramway. The bonds are secured by a first mortgage on real estate and improvements in the business district of Denver, which are said to be essential to the economical operation of the Denver City Tramway. The property covered by the mortgage is leased to the Denver City Tramway for ninety-nine years at a rental which provides for operating expenses, taxes and principal and interest on the bonds. The bonds are due $60,000 annually from Sept. 1, 1916, to 1936 and $55,000 on Sept. 1, 1936. The interest is payable March 1 and Sept. 1.

Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, New York, N. Y.—The Forty-second Street, Manhattanville & St. Nicholas Avenue Railway has applied to the Public Service Commission of the First District of New York for permission to issue a supplemental mortgage and to extend to March 1, 1940, the time for the payment of its first mortgage bonds. This company is one of the principal lines of the Third Avenue Railway System, which was recently reorganized after going through the hands of a receiver, Frederick W. Whitridge, who was later made president of the reorganized company. The company has outstanding $1,200,000 in first mortgage 6 per cent bonds. These bonds were payable on March 1, 1910, but were not paid, and the company now asks to extend them at 5 per cent from March 1, 1912, up to which time the interest has been paid or provided for. The commission will hold a hearing on the application on June 7, 1912.

Greenville (S. C.) Traction Company.—H. P. Keen, of the American Pipe & Construction Company, Philadelphia, Pa., and his associates have disposed of the property of the Greenville Traction Company to the Southern Power Company.

Idaho Railway, Light & Power Company, Boise, Idaho.—The Idaho Railway, Light & Power Company, noted in the Electric Railway Journal of April 20, 1912, as having increased its authorized capital stock from $20,000,000 to $30,000,000, is a consolidation of the Boise & Interurban Railway, Boise Valley Railway, Southern Idaho Light, Heat & Power Company, Dewey Electric Light & Power Company and Caldwell Power Company. The officers of the company are: William Mainland, Oshkosh, Wis., president; Samuel L. Fuller, New York, N. Y., vice-president; G. E. Hendee, New York, N. Y., secretary and treasurer; E. A. Wetmore, Boise, Idaho, assistant treasurer; O. G. F. Markhus, Boise, Idaho, general manager; R. W. Watson, New York, N. Y., managing director.

Lawton & Fort Sill Electric Railway, Lawton, Okla.—B. R. Stephens, who resigned as general traffic manager of the Illinois Traction System in 1911 to become general superintendent of the Choctaw Railway & Lighting Company, McAlester, Okla., is reported to have purchased the property and rights of the Lawton & Fort Sill Electric Railway on behalf of himself and associates.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—A first mortgage to secure an issue of $2,000,000 of 5 per cent bonds maturing in 1922, in favor of the Brooklyn Trust Company, Brooklyn, N. Y., as trustee, has been filed for record in Mahoning County by the Republic Construction Company, a subsidiary of the Ma-

honing & Shenango Railway & Light Company. The proposed $1,500,000 power station at Lowellville and property in Youngstown are pledged as security for the loan.

Manhattan & Jamaica Railroad, New York, N. Y.—Application has been made to the Board of Estimate and Apportionment of New York for permission to sell and assign the franchise of the South Shore Traction Company, now in the hand of receivers, to the Manhattan & Jamaica Railroad, incorporated on April 30, 1912, to take over the property of the South Shore Traction Company at private sale. The application will be heard on June 6, 1912.

Mid-Crosstown Railway, New York, N. Y.—The Mid-Crosstown Railway has petitioned the Public Service Commission of the First District of New York for permission to issue and deliver to the bondholders' committee of the Twenty-eighth and Twenty-ninth Streets Crosstown Railroad certain stocks and bonds. The Mid-Crosstown Railway was organized in February, 1912, to take over from the bondholders' committee the property of the Twenty-eighth and Twenty-ninth Streets Crosstown Railway, which was a part of the old Metropolitan Street Railway System and went into receivers' hands after the bankruptcy of the Metropolitan Street Railway. The officers of the new company are: John W. Hamer, president; A. S. Gilbert, vice-president; Francis Gilbert, treasurer, and Leon Lauterstein, secretary. The company wants the consent of the commission to issue to the bondholders' committee 5000 shares of its capital stock, $200,000 of fifty-year 5 per cent bonds under first mortgage and $300,000 of fifty-year 5 per cent bonds under an adjustment income mortgage. The commission will hold a hearing on the petition on June 7, 1912.

Middle West Utilities Company, Chicago, Ill.—It is stated that the Middle West Utilities Company, which was organized recently by Samuel Insull, president of the Commonwealth Edison Company, Chicago, Ill., and his associates, will include among the properties which it proposes to take over the Louisville & Northern Railway & Light Company, the Louisville & Southern Indiana Traction Company, the United Gas & Electric Company of Southern Indiana and the New Albany Water Company. Mr. Insull is president of the first three of these companies. At the outset the stock of the Middle West Utilities Company will amount to $10,000,000, of which $4,000,000 will be 6 per cent preferred stock and $6,000,000 common stock. No bond issue is contemplated for the new corporation.

Monongahela Traction Company, Fairmont, W. Va.—The Monongahela Traction Company, to which reference was made in the ELECTRIC RAILWAY JOURNAL of May 25, 1912, has elected officers as follows: S. L. Watson, president; J. H. Wheelwright, vice-president; Walton Miller, secretary-treasurer; J. O. Watson, general manager; Smith Hood, general superintendent; D. L. Watson, C. W. Watson, A. B. Fleming, G. T. Watson, Walton Miller, C. L. Shaver, J. O. Watson, S. C. Denham, J. H. Wheelwright and Van Lear Black, directors.

Nashville Railway & Light Company, Nashville, Tenn.—A special dividend of 11 per cent was paid on May 15, 1912, on the $4,000,000 of common stock of the Nashville Railway & Light Company in accordance with the plan of purchase by Byllesby & Company, Hodenpyl, Hardy & Company and their associates. The First National Bank, Nashville, gives notice that it has received payment under the option contract and will make payment of $114 per share of common stock upon presentation of the receipts. Only $65,700 of the $4,000,000 of common stock has not been turned in by the stockholders.

Securities Corporation General, New York, N. Y.—The Securities Corporation General has been formed under the laws of Virginia to underwrite public service and railway corporations. It has a capital of $5,000,000 of 6 per cent cumulative preferred stock, of which $3,000,000 has been issued, and $5,000,000 of common, of which $3,250,000 has been issued. The common stock is owned by Chandler Brothers & Company and has been placed in a voting trust for five years. Among the directors of the new company are F. T. Chandler, Philadelphia; Alexander J. Hemphill, president of the Guaranty Trust Company, New York; S. Z. Mitchell, president of the Electric Bond & Share Company; J. G. White, and F. W. Roebling, Jr.

Spartanburg Railway, Gas & Electric Company, Spartanburg, S. C.—Ussing, Scoville & Company, Philadelphia, Pa., confirm the report that they have secured control of the Electric Power & Manufacturing Company, Spartanburg, and the Spartanburg Railway, Gas & Electric Company.

Sunbury & Northumberland Electric Railway, Sunbury, Pa.—Governor Tener of Pennsylvania has approved the agreement reached on Jan. 31, 1912, to consolidate the Sunbury & Selinsgrove Electric Street Railway, the Sunbury & Northumberland Electric Railway, the Sunbury, Lewisburg & Milton Railway, the Montandon & Milton Street Railway and the Chillisquaque Connecting Street Railway. As stated in the ELECTRIC RAILWAY JOURNAL of Feb. 10, 1912, page 256, the new company is to be known as the Sunbury & Susquehanna Railway. The capital stock of the company is to be $1,000,000 and $1,200,000 of bonds are to be issued.

United Light & Railways Company, Grand Rapids, Mich.—A meeting of the stockholders of the United Light & Railways Company has been called for June 1, 1912, to vote to increase the number of directors from nine to fifteen and to authorize an issue of $4,375,000 of bonds.

Toledo, Port Clinton & Lake Side Railway, Toledo, Ohio.—The control of the Toledo, Port Clinton & Lake Side Railway has been purchased by W. S. Barstow & Company, New York, N. Y., the bondholders' committee having announced that all of its $1,500,000 bonds outstanding had been deposited under the purchase agreement. It is understood that the price paid for the property was $1,100,000, which will be distributed among the bondholders after the payment of all expenses and other charges, the holders of the bonds realizing about 65 for them. The property is turned over to the new owners free of all incumbrances, and a new company will probably be formed.

Dividends Declared

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., quarterly, 1½ per cent, preferred.

Louisville (Ky.) Traction Company, quarterly, 1 per cent, common.

Nashville Railway & Light Company, Nashville, Tenn., special, 11 per cent.

Norfolk Railway & Light Company, Norfolk, Va., 2½ per cent.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1 per cent, common.

Northern Texas Electric Company, Fort Worth, Texas, quarterly, 1½ per cent, common.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

Virginia Railway & Power Company, Richmond, Va., 2½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE ELECTRIC COMPANY

Period	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1 m., Mar., '12	$10,880	$6,903	$3,977	$1,729	$2,248
1 " " '11	9,189	5,730	3,459	1,717	1,742
12 " " '12	126,159	77,279	48,880	20,745	2,248
12 " " '11	111,650	72,485	39,165	20,677	1,742

BROCKTON & PLYMOUTH STREET RAILWAY

1 m., Mar., '12	$7,514	$6,511	$1,003	$1,054	†$50
1 " " '11	7,303	6,368	936	1,106	†170
12 " " '12	119,566	90,831	28,736	12,746	15,990
12 " " '11	120,067	89,362	30,705	13,496	17,209

CAPE BRETON ELECTRIC COMPANY

1 m., Mar., '12	$24,410	$15,856	$8,554	$5,636	$2,918
1 " " '11	24,199	14,752	9,447	5,655	3,792
12 " " '12	340,261	186,217	154,044	67,775	86,269
12 " " '11	328,869	176,899	151,971	67,875	84,096

DALLAS ELECTRIC CORPORATION

1 m., Mar., '12	$143,057	$96,069	$46,988	$24,706	$22,282
1 " " '11	129,528	90,080	39,448	21,472	17,976
12 " " '12	1,655,597	1,110,915	544,683	250,369	294,313
12 " " '11	1,515,221	1,026,036	489,185	245,844	243,341

EL PASO ELECTRIC COMPANY

1 m., Mar., '12	$63,055	$33,523	$29,532	$7,018	$22,513
1 " " '11	57,090	34,294	22,796	6,673	16,123
12 " " '12	712,372	405,751	306,622	82,412	224,210
12 " " '11	650,990	397,844	253,147	80,291	172,856

GALVESTON-HOUSTON ELECTRIC COMPANY.

1 m., Mar., '12	$149,417	$93,494	$55,922	$33,387	$22,535
1 " " '11	116,287	76,024	40,263	19,643	20,620
12 " " '12	1,627,656	1,012,273	614,682	274,096	340,587
12 " " '11	1,348,693	861,990	486,703	237,371	249,332

Traffic and Transportation

The Law on Accident Prevention

Charles B. Scott, claim agent of the Louisville & Northern Railway & Light Company, who has had charge of the accident prevention campaign of the company, has published an article, which has been distributed among the trainmen employed by the company, describing what the law expects from the crew on the car. Mr. Scott believes that this exposition will aid in impressing the trainmen with the fact that carefulness is not only desirable but obligatory. Among other things he says:

"At no time and on no occasion should the trainman allow his mind to become lax with regard to his general duties, for the law demands the constant care required by their strict and never-ceasing observance with respect to all persons and to all property. A great many accidents occur due to the fault or negligence of the injured persons, and day after day the traveling public, forgetful of all the dangers that lurk around cars and track, will take chances and absent-mindedly place themselves in positions of danger which might be avoided by care and thoughtfulness. It is the old story of familiarity breeding contempt. There have been perhaps 999 escapes; so many that it is reasonable to suppose that the thousandth one will not fail, and yet, contrary to all laws of expectation, it is this last attempt to violate the sense of discretion and care that fails. The law says that 'gross negligence is a reckless or careless disregard for consequences and a failure to exercise proper, or in fact any, care to avoid the danger,' and such recklessness and carelessness upon the part of one who is injured usually places upon him responsibility for his injury, and the law is that usually under such circumstances he cannot recover damages. I say 'usually' because there are cases of accidents growing out of such carelessness on the part of the public wherein a responsibility for the prevention of an accident becomes the special duty of the trainmen.

"The special duty to take particular precautions had reference to particular persons and particular property, and this special duty cannot be set forth in the book of rules, because it comes about from the conditions which present themselves in a particular case. It cannot be anticipated and covered by a general rule. The special duties required by law do not rest upon the operator or conductor of a car at all times, but the responsibility for such duty is immediate and at the time of possible accident to some particular person or some particular property, and arises from the situation wherein the person has placed himself in peril and such peril is seen or could, by the exercise of proper care, become known to the trainman.

"This is a wise and just provision of the law, because common sense tells us that we should not only safeguard the public by our own conduct and obedience to law but that we should go further and do all that we can to protect from injury those who have, by their own carelessness, placed themselves in a dangerous position. The law requires the motorman to give a signal of his approach and to have his car under control when approaching a wagon or any object going in the same direction as the car, and this is a general duty well understood.

"But conditions would be changed if the wagon referred to was to break down suddenly on the track in front of the car at a time when it was too late for the driver to extricate himself and his property from the perilous position; there the special duty would confront the motorman, and at just this time would his responsibility come, for it would then become the duty of the motorman, even if the driver's own negligence placed his wagon in this situation, to exercise every precaution to prevent injury, and the application of general duties only would not suffice to free him from blame.

"Trainmen must not only so govern their own conduct and by constant and thoughtful care be free from negligence in their important work of serving the public and conserving life and property, but they must, by study and sober meditation, become so thoroughly familiar with their general duties that they will at no time and at no place thoughtlessly or negligently violate them. By so doing the number of accidents on our electric lines will be very materially decreased. Trainmen must also be alert as to these special duties required of them by law, and must, so far as is in their power, protect people from their own carelessness, and must at such times feel this to be their special duty and particular responsibility."

Many suggestions have been received from employees as to methods of preventing accidents.

Increase in Wages of Subway and Elevated Employees in New York

T. P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., has announced an increase in the wages of a large number of employees in the station and transportation departments of the subway and elevated lines, in the chief engineer's department, the car equipment department and the motive power department. The increases will total $230,000 the first year. The increases were effective from May 12, 1912. They affect so many employees that it is impossible to give the complete schedule. The statement contained in the original announcement in so far as it concerns conductors, guards and motormen follows:

Occupation	Present Rate (Per Day of Ten Hours)	New Rate (Per Day of Ten Hours)
Conductors	First year $2.25	First year $2.35
	Second year 2.30	Second year 2.35
	Third year 2.40	Third year 2.45
	After third year 2.50	Fourth year 2.55
		Fifth year 2.60
Guards	First year 1.90	First year 2.00
	Second year 2.00	Second year 2.00
	Third year 2.10	Third year 2.10
	Fourth year 2.15	Fourth year 2.20
	After fourth year 2.20	Fifth year 2.30
Motormen	First year 3.00	First year 3.00
	After first year 3.50	After first year 3.50
		After fifth year 3.75

Favors for the Ladies.—The Illinois Traction Company announced that on Memorial Day it would give every lady passenger on its lines a hatpin.

Schedules Fixed in Washington.—The District Electric Railway Commission has issued an order prescribing in detail the schedule to be followed at specified hours by the Washington Railway & Electric Company and the Brightwood Railway, Washington, D. C., in operating their Georgia Avenue and Ninth Street cars.

New Fare Rule on Maine Road.—Under a new rule, the conductors of the Rockland, Thomaston & Camden Street Railway, Rockland, Maine, are to begin taking fares at the rear end of the car instead of the front end on account of persons jumping on the rear end and riding till just before the conductor has reached them and then dropping off.

Fare Order Rescinded by the Delaware Commission.—The Board of Public Utility Commissioners of Delaware has rescinded the order made some time ago directing the Wilmington & Philadelphia Traction Company, Wilmington, Del., to restore six tickets for a quarter. The company resisted the order in the United States Court, on the ground that the proceedings before the commission were irregular.

Park Improvements by Lehigh Valley Transit Company.—The Lehigh Valley Transit Company has improved Central Park at Rittersville, which it owns, at a cost of $75,000. More than $3,000 was spent in reforestation. The walks have been widened, the electric fountain has been rebuilt and the lighting system has been improved. R. P. Stevens, president of the company, entertained the newspaper men of Allentown and a number of invited guests at dinner in the park recently.

Connections Arranged Between Steam and Electric Railways.—The Middle Tennessee Railway, a steam railroad between Franklin and Mount Pleasant, Tenn., has been formally opened. An unusual feature in connection with the line is the working arrangement which has been made with the Nashville Interurban Railway, an electric railway which operates between Nashville and Franklin, whereby connections will be made so as to enable passengers from Nashville to go through to Mount Pleasant without loss of time.

Willow Grove Park Opened.—Willow Grove Park, owned and operated by the Philadelphia (Pa.) Rapid Transit Com-

pany, was opened on May 25, 1912. The customary banquet in celebration of the opening was given on the evening of May 24, 1912, at the Casino, by Superintendent Davies. The 200 guests present at the opening included C. O. Kruger, president of the company; Thomas E. Mitten, chairman of the executive committee, and other officers and directors of the company.

Prizes for Register Records in Denver.—John F. Ohmer, president and general manager of the Ohmer Fare Register Company, Dayton, Ohio, has notified the employees of the Denver (Col.) City Tramway that he will give the employees $200 in three prizes for the year of 1912, beginning with January and ending with December, as follows: To the division making the best Ohmer record, $100; to the division making the second best Ohmer record, $75; to the division making the third best Ohmer record, $25. The prizes are to be awarded in accordance with the decision of a committee composed of representatives from each division of the Denver City Tramway, and are to be payable in January, 1913, after the report of the duly authorized committee has been received.

Accidents in New York in April.—The accident report of the Public Service Commission of the First District of New York shows that 474 more persons were injured by the elevated, subway and surface railroads in Greater New York during April, 1912, than during the corresponding month of 1911. In April, 1911, 2,846 people were injured, whereas 3,310 were injured in 1912. These, according to the report of the commission, included 2,229 passengers, 572 who were not passengers and 509 who were employees of the railroads. Twenty-two of the injured died, and thirty received fractured skulls or had their limbs amputated. There were ninety-six car collisions during the month. Persons and vehicles struck by cars numbered 1,584; in boarding cars 725 passengers sustained injuries, while 610 required medical attendance because of being thrown in alighting from cars. There were 5,481 accidents of all kinds during April.

Universal Transfers on Chicago Elevated Railways Ordered by City Council.—An ordinance requiring the interchange of transfers between the four elevated railways included in the Chicago elevated railway system was passed by the City Council of Chicago on May 20, 1912, and signed by Mayor Harrison on May 22, 1912. Under the terms of the ordinance the elevated railways are allowed ten days to prepare to issue the transfers. If at the end of that period the provisions of the ordinance are not complied with, the city authorities are empowered to enforce the ordinance by written order from the Mayor or by the use of the city's police power if necessary. The elevated railways agreed verbally to embody the universal transfer clause in the unification ordinance. As noted in the ELECTRIC RAILWAY JOURNAL of April 27, 1912, the ordinance was prepared as a result of an opinion rendered by W. H. Sexton, corporation counsel, of Chicago. Although the elevated railways are being operated as one system, the organizations and accounts of the four companies which are included in the Chicago Elevated Railways have been kept separate and distinct.

Ordinance Passed to Permit Smoking in Kansas City Cars.—Mayor Jost, of Kansas City, Mo., has signed the ordinance passed by the City Council to require the Metropolitan Street Railway to permit smoking on the three rear seats and the platforms of cars during the summer months. J. M. Egan, president of the Metropolitan Street Railway, is quoted as follows in regard to the attitude of the company toward the ordinance: "The company will certainly avail itself of every legal resource to prevent the ordinance from becoming effective. The interests of all were considered by the officers of the company before the order which prohibits smoking went into effect, and it was decided best for the greatest number to prohibit smoking. Our legal department holds that it is a matter of service and entirely within the jurisdiction of the company to regulate smoking on the cars." It has since been decided by the receivers of the company to permit the patrons of the company to vote on the question of smoking on cars and to abide by the result of this vote. If the majority is against smoking, the company will disregard the ordinance and carry the matter to the courts, if necessary.

Personal Mention

Mr. R. C. Cram resigned on May 1, 1912, as assistant engineer in the way department of the Connecticut Company, New Haven, Conn., to accept a position as assistant engineer of surface track with the department of way and structure of the Brooklyn (N. Y.) Rapid Transit System.

Mr. J. F. Uffert, master mechanic of the Hudson Valley Railway, Glens Falls, N. Y., has been appointed master mechanic of the United Traction Company, Albany, N. Y., and will assume most of the duties formerly devolving upon Mr. M. C. Carpender, who has become connected with the Consolidated Car Heating Company.

Mr. W. H. Elder has succeeded Mr. G. W. Ogsbury as auditor of the United Traction Company, Albany, N. Y.; Hudson Valley Railway, Glens Falls, N. Y.; Capitol Railway, Albany, N. Y.; North River Railway, Saratoga Springs, N. Y.; Cohoes (N. Y.) Railway, Plattsburg (N. Y.) Traction Company and Troy & New England Railway, Troy, N. Y.

Mr. T. C. Cherry, who resigned recently as general manager of the Schenectady (N. Y.) Railway to become connected with Allen & Peck, Inc., has been elected vice-president and general manager of the Baltimore & Annapolis Short Line. The management of this road, as stated elsewhere in this issue, has been taken over by Allen & Peck, Inc. A biography and a portrait of Mr. Cherry were published in the ELECTRIC RAILWAY JOURNAL of March 23, 1912.

Mr. Winfield A. Huppuch made known on May 26, 1912, his intention to resign as a member of the Public Service Commission of the Second District of New York. Mr. Huppuch was appointed to serve on the commission until Feb. 1, 1916. It is thought likely that Governor Dix will appoint Mr. H. P. Bissell, Buffalo, N. Y., to the commission to succeed Mr. Huppuch, the Senate having refused at the recent legislative session to approve the nomination of Mr. Bissell.

Mr. Lucius S. Storrs, who has been vice-president of the Connecticut Company, New Haven, Conn., and the Berkshire Street Railway, Pittsfield, Mass., since July, 1911, will, it is stated, be elected a vice-president of the New York, New Haven & Hartford Railroad, in charge of all the electric railways which the company controls in Connecticut, Massachusetts, Rhode Island and New York. Mr. Storrs was formerly president of the New England Investment & Security Company and executive head of the street railway systems serving central Massachusetts under an operating organization including the Worcester and Springfield urban and interurban networks and extending from the Connecticut Valley to Rhode Island, via the Blackstone Valley.

Mr. Peter M. Kling has accepted the position of engineer of car construction in the mechanical department of the Brooklyn (N. Y.) Rapid Transit System. He will devote his time to supervising the design and building of the new types of rolling stock for which the company is now making provision. Mr. Kling has long been known for his work with the car builders of this country. His experience dates back to the abandonment of animal traction. He was successively superintendent of the Brownell Car Company, vice-president and general manager of the St. Louis Car Company and general manager of the John Stephenson Company. His last position was as manager of the passenger car department of the Pressed Steel Car Company, where he added largely to his previous knowledge of steel passenger cars for city service.

Mr. J. T. Nyhan has resigned as general manager of the Macon Railway & Light Company, Macon, Ga., and has become associated with Mr. W. J. Massee, who is promoting the Georgia Public Service Corporation. Mr. Nyhan has been general manager of the company since March, 1909. He was formerly connected with the American Water Works & Guarantee Company, Pittsburgh, Pa., for which he was engaged in special work at Shreveport, La. Before becoming connected with the American Water Works & Guarantee Company in 1908 he was superintendent and general manager of the Macon Railway & Light Company, holding these positions from 1893 to 1907. Before entering the employ of the Macon Railway & Light Company in

1893, Mr. Nyhan was engaged in New York in construction work for the Thomson-Houston and the General Electric companies.

Mr. F. C. Wilkinson, formerly general superintendent of the Lynn division of the Bay State Street Railway, Boston, Mass., has been appointed general manager of the St. Albans & Swanton Traction Company, St. Albans, Vt., which has succeeded the St. Albans Street Railway, the property of which was sold under foreclosure recently. Mr. Wilkinson served for thirty-three years in street railway work in the Lynn and Boston districts. He entered street railway work as a horse car driver with Mr. E. C. Foster, now president of the Manchester Traction Light & Power Company, Manchester, N. H., and operated the first electric car in the Lynn district. In 1894 Mr. Wilkinson was made starter and in 1896 he became superintendent of the Lynn division of the Lynn & Boston Street Railway.

Mr. R. M. Redding has been appointed purchasing agent of the Macon Railway & Light Company, Macon Gas Company, Central Georgia Power Company and Central Georgia Transmission Company, and manager and secretary of the Macon Gas Company, Macon, Ga. Mr. Redding was graduated from Indiana University in 1904 in a course in chemical engineering. During 1905 and 1906 he served as chemist and assistant superintendent of the New Orleans (La.) Gas Light Company. Mr. Redding resigned from this company to become connected with the St. Paul (Minn.) Gas Light Company as chemist in 1906, and in 1907 was appointed chemist and assistant to the manager of the New Orleans Gas Light Company. He served in this capacity until 1909, when he was appointed general manager and purchasing agent of the Macon Gas Light & Water Company. Since 1911 he has been manager and secretary of the Macon Gas Company. As purchasing agent of the Macon Railway & Light Company, Mr. Redding succeeds Mr. T. D. Massee, whose resignation was noted in the Electric Railway Journal of May 25, 1912.

OBITUARY

S. Wade Gunsalus, superintendent of transportation and claim agent for the Southwest Missouri Railroad, Webb City, Mo., died in Kansas City recently after an eight weeks' illness. Mr. Gunsalus was born in Mason County, Illinois, in 1869. His first employment in street railway work was as a motorman in Topeka, Kan. From 1891 to 1893 he was a motorman for the Joplin Electric & Motor Company. He next entered the service of the Southwest Missouri Railroad and was employed as a motorman and as a conductor from 1893 to 1899, when he was made dispatcher. On Feb. 15, 1902, he was appointed superintendent of transportation and claim agent, which offices he continued to fill until his death. Mr. Gunsalus had for some years past arranged his vacations so as to attend the annual convention of the American Electric Railway Association. He is survived by a widow and two daughters.

Report on Rapid Transit Possibilities in Philadelphia

Since the appropriation by the Councils of Philadelphia of $50,000 to the Department of Public Works to defray the expenses of an investigation of the city's transportation problems, as mentioned in the issue of this paper for last week, Director Cooke of the Department of Public Works has appointed as transit commissioner to take charge of this investigation A. Merritt Taylor, president of the Philadelphia & West Chester Traction Company. This appointment was promptly confirmed by Mayor Blankenburg, who expressed his belief that Mr. Taylor's training and ability in the organization, construction and operation of electric railway properties would bring to the city the qualities needed in the direction of the proposed investigation.

The day subsequent to the appointment of Mr. Taylor, or on May 29, the further appointment was announced of Ford, Bacon & Davis, New York, N. Y., to prepare a report upon the possibilities of improving the rapid transit conditions of Philadelphia by subway and otherwise. The commission in this undertaking will have the assistance of an advisory commission of citizens, of which Alva B. Johnson, of the Baldwin Locomotive Works, is chairman.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Big Four Electric Railway, Tulare, Cal.—Application for a charter has been made in California by this company to build a 34-mile electric railway from Tulare to Woodville, thence to Poplar and Porterville, and a branch line from Tulare to Visalia. Capital stock, $500,000. David Oliver, Jr., and H. M. Coffin, San Francisco, are interested. [E. R. J., May 18, '12.]

***Virginia Terminal Company, Washington, D. C.**—Application for a charter has been made in Washington, D. C., by this company to build a crosstown line in Washington. Capital stock, $500,000. Incorporators: Henry Wardman, A. A. Thomas, Washington, D. C., and J. D. Dudley, I. C. Taylor and E. F. Crawford, Virginia.

***Kansas Central Traction Company, Parsons, Kan.**—Chartered in Kansas to build a 70-mile electric railway from Parsons to Coffeyville and a branch line from near Parsons to Columbus. Capital stock, $1,000,000. Incorporators: Phillip Strack, Indianapolis, Ind.; O. C. Randall, A. J. Hiatt, Altamont, Kan.; Barney McDaniel, Mound Valley, Kan.; David E. Toer, Gwynnville, Ind.

***South Fork-Portage Railway, South Fork, Pa.**—Application for a charter has been made in Pennsylvania by this company to build an electric railway between South Fork and Portage. Incorporators: John J. Huebner, Johnstown; Andrew J. Strayer, Walnut Grove; Arthur C. Simler and Charles H. Morgan, Johnstown, and Charles N. Crouse, South Fork.

***Morgantown & Wheeling Railway, Wheeling, W. Va.**—Incorporated in West Virginia to build an electric railway from Morgantown to Wheeling. Capital stock, $1,000,000. Incorporators: Julius K. Monroe and E. M. Lantz, Kingwood, and John M. Gregg, Terence D. Stewart and D. M. Willis, Morgantown.

FRANCHISES

***Bay Minette, Ala.**—C. M. Proctor and Charles C. Hand have asked the Baldwin County Commissioners for a franchise to build an electric railway through the southern part of Baldwin County.

Los Angeles, Cal.—The Pacific Electric Railway has received a franchise from the Council on North Garey Avenue in Los Angeles.

Los Angeles, Cal.—An agreement has been made between the Pacific Electric Railway, the Los Angeles Railway and the Los Angeles Council whereby a line will be built on San Pedro Street from Plaza to Ninth Street, Los Angeles. The franchise is for twenty-one years.

Wilmington, Del.—The People's Railway has asked the Council for a franchise to move its tracks from private right-of-way to Sixteenth Street between Walnut Street, in Wilmington, and the Brandywine, the private right-of-way having been turned over to the city for park purposes.

Sanford, Fla.—The East Florida Traction Company will ask the Council for a franchise in Sanford. The company has received a franchise from the Council in Daytona and has ordered a survey for a reinforced-concrete bridge across the Halifax River. This railway will connect Daytona, Sanford, Deland, Orlando and Seabreeze. A. A. Boggs is interested. [E. R. J., April 6, '12.]

Tampa, Fla.—The Tampa Electric Company has received a franchise from the Council to double-track its lines on Franklin Street from Fortune Street to Seventh Avenue in Tampa.

East Chicago, Ill.—The Hammond, Whiting & East Chicago Electric Railway has received a thirty-five-year franchise from the Council in East Chicago.

East Chicago, Ill.—The Gary & Interurban Railway has received a thirty-five-year franchise from the Council in East Chicago.

Lewiston, Maine.—The Portland, Gray & Lewiston Railroad, Portland, has asked the Mayor and Aldermen for a

franchise on Middle Street from the new carhouse to Main Street in Lewiston.

Brunswick, Md.—The Frederick & Brunswick Railroad has received a franchise from the Council in Brunswick. The line will connect Frederick, Brunswick and Jefferson. Oscar B. Coblentz is interested. [E. R. J., May 25, '12.]

Boston, Mass.—The West End Street Railway has asked the Council for a franchise to extend its lines in Boston.

Moorhead, Minn.—The Fargo & Moorhead Street Railway, Fargo, N. D., has received a franchise from the Council in Moorhead.

Roundup, Mont.—The Roundup Interurban Railway has asked the Council for a franchise in Roundup. It will connect Roundup, Farrell, Lavina and Davis. August Schrump, Roundup, is interested. [E. R. J., May 18, '12.]

***Bethany, Neb.**—The Bethany Traction Company has asked the Council for a franchise to build an electric railway on Saunders Street to the city limits of Havelock. The company has also asked the Council of University Place for a franchise on Holdrege Street to the state farm line of the Lincoln Traction Company in University Place. C. W. Jester, president.

Red Bank, N. J.—The Jersey Traction Company, Keyport, has received a franchise from the Mayor and Councilmen in Red Bank.

Schenectady, N. Y.—The Schenectady Railway has asked the Public Service Commission, Second District, for approval of the recently granted franchises for the construction of several extensions of its lines in Schenectady.

Watertown, N. Y.—The Public Service Commission, Second District, has approved the franchise granted the Black River Traction Company for relaying its present track and laying an additional track along State Street from Public Square to Colorado Avenue in Watertown.

Greencastle, Pa.—The Hagerstown, Greencastle & Mercersburg Railway has received a franchise from the Council to extend its line through Greencastle. [E. R. J., May 4, '12.]

McKeesport, Pa.—The Pittsburgh, McKeesport & Westmoreland Railway has received a franchise from the Council for a line from Bryn Mawr down Lincoln Highway to the tracks of the Pittsburgh Railways, at Fifth Avenue, McKeesport. The company has received a franchise from the Borough Council in Irwin. Work will be begun at once on extensions in McKeesport and Irwin.

Providence, R. I.—The Rhode Island Company has received a twenty-year franchise from the Council in Providence.

Brigham City, Utah.—M. J. Gollightly, Salt Lake City, representing the Ogden, Logan & Preston Railway, has asked the Commissioners for a franchise through the county north of Mantua. It is expected to begin work soon on this line between Brigham City and Logan. [E. R. J., May 18, '12.]

TRACK AND ROADWAY.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—It is reported that this company plans to build an extension from Bessemer to West Lake.

Alabama City, Gadsden & Attalla Railway, Gadsden, Ala.—Plans are being made by this company to lay new rails on Chestnut Street in Gadsden.

Noccalula Railway, Light & Power Company, Gadsden, Ala.—Plans are being made by this company to begin soon the construction of its 3½-mile electric railway from Gadsden to Noccalula Falls. Louis Hart, Gadsden, is interested. [E. R. J., Mar. 23, '12.]

Huntsville, Chattanooga & Birmingham Interurban Railway, Light & Power Company, Huntsville, Ala.—It is reported that this company contemplates spending $75,000 to improve and extend its lines in Huntsville.

Citizens' Light & Transit Company, Pine Bluff, Ark.—This company has received permission from the Council to lay 70-lb. T-rails to replace the present 56-lb. rails and on all new extensions in Pine Bluff.

Visalia Electric Railroad, Exeter, Cal.—Plans are being made by this company to extend its line from Woodlake to Fresno, a distance of 28 miles.

Pacific Electric Railway, Los Angeles, Cal.—As soon as the right-of-way has been secured this company will build an extension to Orange.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company announces that 5 miles of additional track will be laid during the next month through the Moraga Valley. Plans are also being made to extend the line through the San Ramon Valley to Danville and the Oakwood Park farm, as well as from Concord to Avon.

San José (Cal.) Terminal Railway.—This company has applied to the Railroad Commission for permission to sell $950,000 in bonds and $350,000 in preferred stock, with the proceeds of which it is proposed to complete a combined electric and steamship line to connect San Francisco and San José. John A. Mehlin, San José, vice-president. [E. R. J., May 25, '12.]

Stockton (Cal.) Electric Railroad.—Work has been begun by this company to double-track its line from the present terminus on North Street in Stockton out El Dorado Street to Oak Park.

Big Four Electric Railway, Tulare, Cal.—Surveys are being made by this company for a route which extends along Mooney Grove and the Tulare County Park and enters Visalia through South Court Street. The line will connect Tulare, Visalia, Porterville and Lindsay. S. A. McCoy, Visalia, chief engineer. [E. R. J., May 13, '12.]

South Bend & Logansport Traction Company, South Bend, Ind.—Surveys for this company are being made in charge of C. M. Trusdell. The line will follow the old Michigan Road, which connects Michigan City and Indianapolis. The right-of-way has been secured.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—A route devoid of all curves has been selected as the right-of-way for this company's extension from Cedar Rapids to Mount Vernon. The company will soon ask for a franchise in Mount Vernon.

Hutchinson & Western Interurban Railway, Hutchinson, Kan.—This company has completed its surveys between Hutchinson and Hudson and surveys have begun to Larned and Great Bend. F. P. Roehr, Hutchinson, general manager. [E. R. J., May 4, '12.]

***Independence, Neodesha & Topeka Railway, Independence, Kan.**—This company plans to complete its organization at once and apply for a charter to build an electric railway from Independence to Neodesha and Topeka. Power will be purchased from the Kansas Electric Light & Power Company, Independence. Among those interested are Thomas Wagstaff, A. C. Stich and Charles Kerr, Independence; W. C. Haverstick, Sycamore, and A. L. Scott and W. H. Edmundson, Altoona.

Arkansas Valley Interurban Railway, Wichita, Kan.—Surveys are being made by this company to Burrton and Hutchinson.

***Covington, Ky.**—Plans are being made for the construction of an electric railway to connect Covington and Paris, Ky. The route lies through Butler, Falmouth, Mount Olivet and Cynthiana, paralleling the Knoxville division of the Louisville & Nashville Railroad. The preliminary survey is now being made. J. B. Walker, Cincinnati, A. C. Walker, Luray, Va., and A. L. Claiborne, Richmond, Va., are interested.

Kentucky Traction & Terminal Company, Lexington, Ky.—It is reported that this company is considering an extension from Lexington to Nicholasville so as to reach Lancaster, which is situated about 15 miles distant from Nicholasville.

United Railways & Electric Company, Baltimore, Md.—This company is asked to consider plans to extend its line 20 miles north to the Pennsylvania line to meet the lines of the York Railways at the Maryland line.

Boston (Mass.) Elevated Railway.—This company has placed in operation the extension of its lines to East Cambridge.

Mesaba Electric Railway, Duluth, Minn.—Contracts have been awarded by this company for grading between Chisholm and Hibbing to C. Swenby and John Parks. Work will be begun at once. Oscar Mitchell, Duluth, president. [E. R. J., May 25, '12.]

Laurel Electric Light & Power Company, Laurel, Miss.—Work will be begun at once by A. M. Hughes & Company, Chicago, on the construction of this 3-mile electric railway in Laurel. John A. Bagley is in charge. [E. R. J., Nov. 18, '11.]

Metropolitan Street Railway, Kansas City, Mo.—This company has been asked to extend its stock yards line north on McGee Street to Independence Avenue in Kansas City.

Springfield (Mo.) Traction Company.—Estimates are being made by this company for an extension of its Monroe Street line in Springfield in the near future.

*Bethany (Neb.) Traction Company.—This company has been organized to build an electric railway from the state farm line on Holdrege Street to Saunders Street in Bethany, extending north on that street to the southwest corner of the campus of Cotner University. Capital stock, $25,000. Officers: Dr. C. W. Jester, president; John O. Roland, vice-president; Nelson Meyr, second vice-president; J. Z. Briscoe, secretary, and A. V. Cutter, treasurer.

Manchester (N. H.) Street Railway.—The work of double-tracking this company's line on Bridge Street from Elm to Beach Street, in Manchester, will be begun in the near future.

International Railway, Buffalo, N. Y.—This company has ordered 2,500 tons of rails from the Lackawanna Steel Company.

Hendersonville (N. C.) Traction Company.—This company has placed in operation its 2-mile extension from the passenger station of the Southern Railway in Hendersonville to Columbia Park.

Lake Shore Electric Railway, Cleveland, Ohio.—This company will do some financing in the near future in order to provide funds for an extensive program of improvements. The proposed new work includes a cut-off between Sandusky and Huron, Ohio, and the elimination of several curves. Several bridges are to be replaced with steel structures.

Galt, Preston & Hespeler Street Railway, Galt, Ont.—Work has been begun by this company on its extension in Galt to the newly opened factory district.

Toronto & York Radial Railway, Toronto, Ont.—Surveys have been made by this company in Toronto to build a cut-off to connect this railway with the Toronto-Ottawa branch of the Canadian Northern Railway.

Lehigh Valley Transit Company, Allentown, Pa.—Material is now being assembled by this company for the construction of the last link in its Philadelphia division between Norristown and Lansdale.

Altoona & Logan Valley Electric Railway, Altoona, Pa.—During the summer this company plans to rebuild its entire line on Eleventh Avenue from Thirteenth Street to Bridge Street in Altoona.

West Penn Railways, Pittsburgh, Pa.—This company, which operates the Freeport lines, has determined that future extensions of these lines shall include a continuation of the line up the Allegheny valley to Freeport, and from there one line is to continue up the Allegheny to Kittanning and another will extend up the Kiskiminetas valley to Leechburg, to connect with the existing system there. It is planned to build these lines in the near future.

Chambersburg, Greencastle & Waynesboro Electric Railway, Waynesboro, Pa.—Plans are being made by this company to begin soon the extension from Penmar to Monterey.

Spartanburg & Glenn Springs Railroad, Spartanburg, S. C.—Plans are being made by this company to begin soon the construction of its 14-mile electric railway from Spartanburg to Glenn Springs, via Cedar Springs. James T. Harris is interested. [E. R. J., March 2, '12.]

Nashville-Gallatin Interurban Railway, Nashville, Tenn.—Rails will be laid at once by this company along its line between Nashville and Gallatin. The roadbed has been completed. A number of bridges will be built, the one at Rockland to be 1300 ft. long. H. H. Mayberry, president. [E. R. J., March 30, '12.]

Texas Electric Company, Dallas, Tex.—This company advises that it is a holding or construction company for the Trinity Valley Traction Company. It has begun the surveys and preliminary work and expects to begin the construction early in the fall on this 270-mile electric railway to connect Dallas, Waxahachie, Corsicana and Palestine. Capital stock, $100,000. Officers: J. V. Watkins, 502 Scollard Building, Dallas, president and general manager; R. M. Nunley, Jacksonville, vice-president, and P. A. McCarthy, Lufkin, chief engineer. [E. R. J., May 18, '12.]

Longview, Tex.—Nearly all the equipment has been received and work has been begun on the electric railway in Longview. This is part of a plan to build a belt line around Longview. J. C. Turner, Longview, is interested. [E. R. J., April 15, '12.]

Ogden (Utah) Rapid Transit Company.—Work will be begun by this company in Ogden about June 15 extending and rebuilding its lines with 45-lb. rails.

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—The Monongalia County Court has authorized the citizens of Clay District to vote for a bond issue of $200,000 to insure the immediate extension of this railway to Blacksville. This connects with the Waynesburg-Blacksville line, now under construction, and eventually will be a part of an electric railway from Grafton, W. Va., to Pittsburgh.

Parkersburg & Ohio Valley Electric Railway, Parkersburg, W. Va.—Work is under way on this company's extension to North Parkersburg.

SHOPS AND BUILDINGS

Geary Street Municipal Railway, San Francisco, Cal.—The Board of Public Works has been authorized by the Supervisors to advertise for bids for the construction of the new carhouses for this company. Bids were to be opened on June 1.

Vallejo & Northern Railway, Vallejo, Cal.—This company has begun reclaiming 23 acres of land north of Vallejo, which will be used for warehouses and carhouses. The company's tracks are to be laid along the waterfront to Main Street, where its terminal and depot will be built.

Washington Railway & Electric Company, Washington, D. C.—During the next two months this company will award contracts to build new carsheds on P Street, S. W., Washington. They will have storage room for eighty cars.

Louisville (Ky.) Railway.—This company plans to build a new passenger and freight depot at Prospect, the eastern terminus of its Prospect suburban line.

Mesaba Electric Railway, Duluth, Minn.—This company plans to begin work at once on a carhouse in Virginia.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—Contracts for the construction of the combination carhouses and repair shops to be built across the river in North Kansas City have been awarded. The foundation work will be constructed by Griffith & McMurry, Kansas City, and the building by E. L. Winn, Kansas City.

Hudson Valley Railway, Glens Falls, N. Y.—This company plans to abandon its freight station on Park Street, Mechanicsville, and build a new one on South Main Street in the near future.

Schenectady (N. Y.) Railway.—This company has awarded the general contract for a new office building in Schenectady to Raymond E. Booth, Schenectady. The structure will be three stories and of stone, brick and concrete construction. The cost is estimated to be about $85,000. [E. R. J., April 13, '12.]

Ohio Electric Railway, Cincinnati, Ohio.—Work has been begun by this company fitting up a building on Limestone Street, Springfield, for use as a freight warehouse. The second story will contain an office room and space for storage. [E. R. J., March 16, '12.]

Cincinnati (Ohio) Traction Company.—This company has purchased property at 1323 Walnut Street, Cincinnati, and its line wagon station will be removed from Fifth Avenue to the new location. A building will be constructed on the property for the use of the company.

Portsmouth Street Railroad & Light Company, Portsmouth, Ohio.—During the summer this company plans to build a new carhouse in the West End, Portsmouth. The structure will be 100 ft. x 200 ft. and of brick and cement

construction. The company's present carhouse on Offnere Street will be used for other purposes.

Mansfield Railway, Light & Power Company, Mansfield, Ohio.—Work has been begun by this company on its new station in Shelby. The structure will be 36 ft. x 50 ft. and of concrete block construction.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Work will be begun at once by this company on its open car storage plant on the triangle at Fond du Lac Avenue, Thirty-fifth and Locust Streets, in Milwaukee. It will replace the carhouse at Chestnut and Twenty-seventh Streets and on Twelfth Street. In the center of the storage yard there will be a building for repairing and washing. The building will have a capacity of eighty cars and area around it for 250. At every fifth track there will be a fireproof wall. Club rooms and an athletic field for employees will be features of the station. [E. R. J., Nov. 11, '11.]

POWER HOUSES AND SUBSTATIONS

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—This company, which is one of the subsidiaries of the Illinois Traction System, has purchased the lighting properties at Chenoa, Gridley and El Paso and is planning to connect them with a transmission line from the central station at Bloomington, a distance of approximately 33 miles.

Cairo & St. Louis Railway, Cairo, Ill.—This company advises that it has just placed the contract for a new power station, doubling the present capacity of its plant in Cairo.

Illinois Traction System, Peoria, Ill.—This company's new substation, now under construction at Bondville, will be one story, 23 ft. x 70 ft., and of brick construction. [E. R. J., April 13, '12.]

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—The report in the ELECTRIC RAILWAY JOURNAL of May 18 that the power house of this company at Waterloo had been destroyed by fire was somewhat misleading. The fire destroyed the old power house and machinery, which has been replaced by a new plant which adjoins the old structure. The fire also burned the roof over the boiler room which now takes care of the new plant, but fortunately the roof did not fall in on the boilers and other equipment in this section of the power house building. As the roof over the boiler room was being raised to furnish sufficient head room for a new coal and ash-handling system and the company anticipated replacing it with one of fireproof construction as soon as proper clearance was allowed, the fire loss was considered slight. It was necessary to close down the new plant for two hours during the progress of the fire.

Portland (Maine) Railroad.—This company is soon to receive its power from the new plant of Consolidated Electric Company, of Portland, at Bonny Eagle on the Saco River. The transmission line is nearly ready for use. The steam power plant will be retained for emergency and auxiliary uses.

Rockland, Thomaston & Camden Street Railway, Rockland, Maine.—This company has made a twenty-year contract to obtain power for its line from the Central Maine Power Company, of Waterville, Maine.

Mesaba Electric Railway, Duluth, Minn.—Work will soon be begun by this company on a new power house in Virginia.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—Contracts for the construction of three substations for this company will be let at once. Two of the substations will be on the St. Joseph branch, one 12 miles from Kansas City and the other at Willowbrook. The third will be built at a point 4 miles east of Liberty on the Excelsior Springs line.

Trenton-Mercer County Traction Company, Trenton, N. J.—This company has awarded the contract for the construction of its new power station along the creek at Lincoln Avenue in Trenton to Newton Bugbee, Trenton. The engine room will be 24 ft. x 80 ft. and the boiler room 32 ft. x 40 ft. The present power house along the creek will be continued.

Lake Shore Electric Railway, Cleveland, Ohio.—Among the improvements planned by this company in the near future will be the addition of new power plant equipment.

Manufactures and Supplies

ROLLING STOCK

Mahoning & Chenango Railway & Light Company, Youngstown, Ohio, is reported in the market for four interurban cars.

Geary Street Municipal Railway, San Francisco, Cal., has ordered forty-three semi-steel cars from the W. L. Holman Company, San Francisco.

Philadelphia (Pa.) Rapid Transit Company has ordered one 36-ft. 6-in. semi-convertible funeral motor body from The J. G. Brill Company.

Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., is reported to be considering the purchase of six large trailer coaches.

Schenectady (N. Y.) Railway has ordered ten double-truck pay-as-you-enter cars from the St. Louis Car Company, through Wendell & MacDuffie, New York, N. Y.

Southern Wisconsin Railway, Madison, Wis., has ordered ten 20-ft. 8-in. pay-as-you-enter car bodies mounted on Brill 21-E trucks from the American Car Company.

Southern Cambria Railway, Johnstown, Pa., has ordered two 43-ft., two-compartment interurban cars mounted on Baldwin trucks from the Niles Car & Manufacturing Company.

Illinois Traction System, Peoria, Ill., has ordered four interurban trailers with trucks from the St. Louis Car Company. This equipment is an exact duplicate of the last twelve cars ordered for Springfield.

Jackson Railway & Light Company, Jackson, Miss., has ordered from the American Car Company four 20-ft. 8-in. semi-convertible car bodies and five 28-ft. semi-convertible car bodies mounted on Brill 27-G-1 trucks.

Mobile Light & Railroad Company, Mobile, Ala., has ordered from the American Car Company eight 21-ft. pay-as-you-enter semi-steel car bodies mounted on Brill 21-E trucks and two 28-ft. pay-as-you-enter semi-steel car bodies mounted on Brill 27-G trucks.

Washington Railway & Electric Company, Washington, D. C., expects to purchase sixty side-entrance city cars complete with trucks and electrical equipment, also five suburban cars to be of similar construction. The company has recently purchased a sweeper and eighteen Brill 27-G-1 trucks from The J. G. Brill Company.

TRADE NOTES

Sherwin-Williams Company, Chicago, Ill., has moved its office from the Steger Building to the People's Gas Building, Michigan Avenue and Adams Street, Chicago.

Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, has been elected a director of the United States Mortgage & Trust Company, New York, N. Y.

Electric Service Supplies Company, Philadelphia, Pa., has received an order from the Plattsburg (N. Y.) Traction Company for sixteen automotoneers, of the Garton-Daniels type, for use with K-10 controllers.

Perry Ventilator Corporation, New Bedford, Mass., has received an order for ventilators to equip the forty prepayment cars for the Boston (Mass.) Elevated Railway now being built by the Laconia Car Company.

Haskell & Barber Car Company, Michigan City, Ind., has appointed F. D. Reemer its purchasing agent with office in Michigan City. Mr. Reemer was formerly assistant purchasing agent of the American Car & Foundry Company, New York, N. Y.

Walter A. Zelnicker Supply Company, St. Louis, Mo., reports having on hand 15,500 kegs of track bolts of different sizes, enough for 4,000 miles of track. The company reports the recent sale of a 30-ton G. E. electric locomotive and states that it finds its business to be generally satisfactory.

Allis-Chalmers Company, Milwaukee, Wis., has been proceeded against by the Continental & Commercial Trust & Savings Bank of Chicago as trustee, to foreclose the $5,000,000 mortgage on the Allis-Chalmers plant. This is a formal step in the reorganization of the company under the receivership.

W. N. Matthews & Brother, St. Louis, Mo., have appointed Warren W. Heim, formerly construction engineer of E. L. Phillips & Company, New York, sales engineer in charge of the Eastern office at 227 Fulton Street, New York, N. Y. Mr. Heim will devote all of his time to the sale of Matthews patented specialties in the territory east of a straight line drawn through Syracuse, N. Y., and Harrisburg, Pa., and north of the North Carolina State line.

Ackley Brake & Supply Company, New York, N. Y., has engaged Frank H. Kaiser to represent it on the road as its special electrical expert. Mr. Kaiser is connected with the Kaiser Electrical Devices Company and the Monarch Refillable Fuse Company, Buffalo, and is the inventor of many electrical devices and appliances. He brought out the Monarch refillable fuse, the sales end of which is under the sole direction of the Ackley Brake & Supply Company. Mr. Kaiser will make special demonstrations of the Monarch refillable fuse, in addition to soliciting business for the Automatic trolley guard, the sales end of which is also now under the direction of the Ackley Brake & Supply Company, and the other specialties handled by this company. He will enter the field as a representative of the Ackley organization early in June.

British Westinghouse Electric & Manufacturing Company, London, England, in its report for 1911 states that the trading, etc., profits amount to $630,715, from which remain to be deducted: Depreciation on machinery, plant, tools, etc., $154,335 (in addition to $30,500 included in reserve for general depreciation); expenses on surplus land and buildings, $21,265; interest on 6 per cent prior lien debentures, $70,080; interest on 4 per cent mortgage debenture stock, $248,270; leaving a balance of $136,760. From this balance have to be deducted the amount required for the prior lien redemption fund, $29,920; proportion of expenses of issue of prior lien debentures, $3,300, leaving a net profit for the year of $103,540. Adding to this the balance brought forward of $25,585, there is a balance of $129,125 to the credit of profit and loss account, which it is proposed should be carried forward.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received orders for railway motors from the following companies: Wilkes-Barre (Pa.) Railway, one quadruple equipment of No. 305 motors and HL control; Tri-City Railway, Davenport, Ia., two quadruple equipments of No. 323-A motors and K-28 control; Capital Traction Company, Washington, D. C., five quadruple equipments of No. 101-B-2 motors and K 29-B control; St. Louis (Mo.) Electric Terminal Railway, seven quadruple equipments of No. 306 C motors; Oregon Electric Railway, Portland, Ore., one quadruple equipment of No. 321 motors and HL control; Laconia (N. H.) Street Railway, one double equipment of No. 101 B-2 motors; Sands Springs (Okla.) Railway, one double equipment of No. 306 motors and type HL control; City & Suburban Railway, Brunswick, Ga., one double equipment of No. 101-R-2 motors and K-10-A control; Comaguey Electric Power Company, Ltd., two single equipments of No. 92-A motors and R-19-A control.

Prepayment Car Sales Company, New York, N. Y., says, in connection with the discontinuance last week of its patent suit against the Pittsburgh Railways for infringement of the pay-within car mechanism, that it found during the course of the trial that additional cars which it claims infringed its patents were added by the defendant company after the suit was started and that the infringements complained of commenced prior to the time the Prepayment Car Sales Company acquired rights under the particular pay-within patent involved in the suit. Under these circumstances, counsel for the Prepayment Company asked permission to withdraw the suit in order that the prior infringements, as well as the additional cars, could all be litigated in a new action, and with the judge's permission this course was pursued. The new suit has been entered and is expected to be reached in the trial calendar for the fall term. The Prepayment Car Sales Company is the selling organization of the Pay-As-You-Enter Car Corporation of New York and the Pay-Within Car Company of Philadelphia and controls some eighty United States patents covering prepayment devices and door and step mechanisms. It was on one of the latter patents that suit was brought.

ADVERTISING LITERATURE

Henry Fresh, Cumberland, Md., has issued a circular in which the Fresh worm-geared hand brake is described and illustrated.

Trolley Supply Company, Canton, Ohio, is mailing a circular in which the merits of the Knutson trolley retriever are discussed.

Western Electric Company, New York, N. Y., is mailing a series of twelve post cards showing views of its works at Hawthorne, Ill.

Wirt Electric Specialty Company, Philadelphia, Pa., is mailing a circular in which attention is called to the Wirt di-el-ite insulating joint and short bracket joint.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued Circular 1194, which covers type Q direct-current engine-driven generators and describes their construction fully as well as illustrating the various parts.

C. H. Hughes & Company, New York, N. Y., are mailing a card calling attention to their business as consulting engineers. They furnish reports on electric railroads, electric lighting and manufacturing companies and investigate commercial possibilities of mechanical and electrical inventions.

Egbert R. Morrison, Sharon, Pa., has issued Circular No. 1, in which the Morrison water-tube boiler is described and illustrated. Arrangements are under way for the manufacture of this boiler in Canada. The Sharon Boiler Works will manufacture the Morrison boiler in this country.

The J. G. Brill Company, Philadelphia, Pa., prints in the May issue of the *Brill Magazine* an illustrated biography of W. Kesley Schoepf, president of the Cincinnati Traction Company and the Ohio Electric Railway. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service, Cincinnati, Ohio," "The 'Near-Side' Car for the Philadelphia Rapid Transit Company," "More Semi-Convertible Cars for York, Pa.," "Interurban Cars for the Oregon Electric Railway," "Single and Double-Truck Cars for the Woodlawn & Southern Street Railway" and "More Brill Semi-Convertible Cars for La Plata, Argentina."

Stone & Webster Engineering Corporation, Boston, Mass., has prepared an illustrated supplement for the June issue of the Stone & Webster *Public Service Journal,* entitled "Puget Sound Development," in honor of the thirty-fifth annual convention of the National Electric Light Association, which is to be held at Seattle, Wash., from June 10 to 14, 1912. The supplement includes the first review of the varied work carried on by the company on Puget Sound. Brief descriptions are presented of the water-power developments on the Puyallup River, Snoqualmie Falls, White River and the Nooksack River, also of the systems of the Seattle Electric Company and the electric railways between Seattle and Tacoma, Seattle and Everett, and Bellingham and Skagit. The last chapter describes briefly some of the large buildings erected by the company in Seattle. The supplement is well printed and contains many interesting illustrations which show the wonderful growth of that territory during the past thirty years and its numerous advantages for water-power development.

H. A. Strauss Company, Chicago, Ill., consulting engineer and successor to the Falkenau Electrical Construction Company, has issued a bulletin calling attention to its record as engineer and contractor. This company designed and installed the low-tension and high-tension control systems at the Gary plant of the United States Steel Corporation. It also acted as designing and consulting engineer for the Salt Lake & Ogden Railway, Salt Lake City, Utah. Hydroelectric plants supplying light and power to the cities of Paw Paw and Crystal Falls, Mich., were also built under contract from the cities. Other notable contracts which this company has undertaken are the sewage purification and disposal system at Cadillac, Mich., the electrical control system for the Pittsburgh Plate Glass Company at Crystal City, Mo., difficult tunnel and submarine pipe and caisson contracts on the Ohio River for the Kentucky Electric Company at Louisville, Ky., the design and construction of the lighting system, including the generating station and transmission system, at Ogden, Utah, and the hydroelectric development of the Davis and Weber Counties Canal Company, Utah.